Fasc. V (Première partie)

MEGALOPTERA

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DU BARON

Edm. de Selys Longchamps

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SYSTÉMATIQUE ET DESCRIPTIF

Smithsonian Institution
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MEGALOPTERA (LATREILLE)

MONOGRAPHIC REVISION

BY

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AT LEYDEN (NETHERLANDS).

Fasc. V.

All the figures in the text and on the plates are drawn or photographed by Dr. H. W. VAN DER WEELE after the types studied by him in several European Museums. They were executed by the Firma JEAN MALVAUX & C°, Brussels.

The names of the species which are not represented in the SELYS' Collection are placed between [ ] and their descriptions are printed in little characters.

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PREFACE.

The present work is the result of my precedent studies in 1905-1907 in the British-, Berlin-, Brussels- and Leyden Museum and is specially based upon the materials in the collection DE SELYS. They have been worked out during the winter of 1907-1908. The study of the genital parts has been made at lamplight in the Laboratory of Anatomy at Leyden, and I am much indebted to Prof. Dr. J. LANGELAAN, the director of that institution, for his kind permission to work there in the evening. The systematical work has been done in the summer of 1908 in the Leyden Museum. I need also to express my thanks to Mr. W. F. KIRBY in London, Count R. DU BUYSSON in Paris, Dr. R. GESTRO in Genoa and M. G. SEVERIN in Brussels for the lent of materials. To the latter I am moreover much indebted for his friendship and for his kind help with regard to the correction, as well as for his zealous activity in behalf of the publication.

LITERATURE.

I think it unnecessary to give here a complete enumeration of the literature of this order, as K. C. Davis has published it in his *Sialididae of North and South America*. Bull. New York State Mus., 68, Ent. 18, p. 442 (1903). I only enumerate here the titles of the works that appeared later.

F. Klapálek, *Trans. Ent. Soc. London,* 1894, p. 489, pl. X, f. 1-4 (1894). Description of a new species of *Raphidia* L., etc.

N. Banks, *Proc. Calif. Acad.*, t. V, p. 515 (1895). Some mexican *Neuroptera*.

Borg, *Entom. Tidskr.*, t. XXII, p. 175 (1901). *Inocellia crassicornis* in Sweden.

N. Banks, *Proc. Ent. Soc. Washington,* t. V, pp. 237-245 (1903). *Neuropteroid* insects from Arizona.

N. Banks, *J. N. York Ent. Soc.,* t. XI, pp. 236-243 (1903). Some new *Neuropteroid* insects.

H. F. Wickham, *Canad. Ent.,* t. XXXV, p. 207 (1903). Meristic variation in *Corydalis cornuta* L.

H. W. van der Weele, *Notes Leyden Museum,* t. XXVI, p. 207 (1906). Uebersicht der Sialiden des Indo-Malayischen Archipels.

H. W. van der Weele, *loc. cit.,* t. XXVIII, p. 141 (1906). Erster Nachtrag zu meiner Uebersicht der Sialiden, etc.

H. W. van der Weele, *loc. cit.*, p. 227 (1907). Notizen über Sialiden und Beschreibung einiger neuen Arten.

N. Banks, *Trans. Amer. Ent. Soc.,* 1907, p. 1 (1907). Catalogue of the *Neuropteroid* insects of the United States.

N. Banks, *Proc. Ent. Soc. Washington*, t. X, pp. 27-30 (1908). On the classification of the *Corydalinae*, with description of a new species.

H. W. van der Weele, *Notes Leyden Museum*, t. XXX, pp. 249-264 (1909). New genera and species of *Megaloptera* Latr.

MEGALOPTERA.

Latreille, Hist. nat. Crust. et Ins., III, p. 289 (1803).

Handlirsch, Sitzungsber. Akad. Wien, CXII, Abth. I, p. 716 (1903).

Platyptera Banks, Ins. New Yersey, p. 51 (1900).

This order of Insects was hitherto regarded only as a family of the *Planipennia,* though it shows rather larger differences than the *Mecoptera* or *Panorpata* which are since longtime separated from them.

The differences from the *Planipennia* or *Neuroptera* s. s. are the following :

Larvae carnivorous, with short biting mandibles, not sucking ones. Terrestrial or aquatic. When aquatic they bear one pair of trachea- gills on each abdominal segment. They pupate in the ground under stones, etc., in a small cavity, but they never spin a cocoon. The pupa is a *pupa libera* and can leap before emerging.

The imagines are mediocre to very large insects, with biting mouthparts and slender legs, without spurs or spines. The four wings are equal in form and size, with a very complete, dense nervature and with a mostly well-developed media between the radialsector and the cubiti. The gonopoda of the male are very primitive in the more original species and consist of a pair of well-developed cerci (appendices superiores). The genitalvalve is simple or double.

In the more primitive *Neuromini* there are moreover a pair of appendices inferiores in the ♂. In the ♀ the appendices superiores are short and the two genitalvalves are short or they form a long ovipositor *(Raphididae)*.

The members of the two families which belong to this order, that of the *Sialidae* and of the *Raphididae,* are very primitive insects. The *Sialidae* are more primitive and have a much larger geographical distribution. The aquatic larvae and the two pairs of appendices in the ♂ much remember the Trichoptera of which they are very probably the precursors. On the other hand the imagines have much relation with the *Planipennia* such as *Osmylidae, Ithone* and *Dilar*.

The more specialised *Raphididae* are probably a very specialised group of the *Neuromini*.

KEY TO THE FAMILIES.

Prothorax very long, nearly as long as the rest of the body. Female with a long ovipositor. Wings small, with open nervature and well-developed pterostigma. Small species. Larvae terrestrial. RAPHIDIDAE.

Prothorax short, scarcely longer than the other thoracical segments. Female without ovipositor. Wings large, with rather dense nervature and ill-defined pterostigma. Mediocre and large species. Larvae aquatic. SIALIDAE.

Fam. SIALIDAE.

This family belongs to the most primitive neuropterous insects, and in the structure of body, genitalia and nervature, besides the structure and biology of the larvae and pupae, they unite the characters of primitive *Trichoptera, Planipennia* and *Mecoptera*.

The geological age of the group is very high and they are without doubt the most primitive recent holometabolous insects.

They may be divided into the following subfamilies and tribes :

Three ocelli, fourth tarsal joint simple, not bilobed. Large and mediocre forms.
Corydalinae Davis.

Ocelli wanting, fourth tarsal joint prominently bilobed. Rather small forms.
Sialidinae Davis.

Subfam. CORYDALINAE.

Male with a pair of appendices superiores and inferiores. Antennae moniliform in both sexes, never pectinate. Head quadrangular, with a more or less developed tooth at the sides and dendriform pattern on the occiput. Wings with more than 3 crossveins between the radius and radialsector. Large forms. Neuromini nov. trib.

Male with only a pair of appendices superiores. Antennae mostly pectinate in the male, moniliform to pectinate in the female. Head triangular, no tooth at the sides. The occiput with linguatiform pattern. Wings always with 3 crossveins between the radius and radialsector. Mediocre to large forms. Chauliodini nov. trib.

Subfam. CORYDALINAE.

This very primitive subfamily is distinct from the *Sialidinae* by the characters of the imagines mentioned above and by the eggs which have, so far they are known, a globular micropylar projection joined to it by a long cylindric neck. They are deposed near the water in several layers upon one another. The larvae, so far as is known about them, have eight lateral filaments or gills, which are slightly or not articulate, and the last segment bears two anal prolegs provided with claws as in the trichopterous family *Rhyacophilidae*.

Of the two tribes included in this subfamily, that of the *Neuromini* is the most primitive and will be treated first.

Trib. **NEUROMINI**

KEY TO THE GENERA.

Sides of the head very enlarged, with two dents. Platyneuromus n. g. America.

Sides of the head with one, more or less distinct dent — 2.

2. Head with a tooth on the occiput, mandibles in the ♂ much larger than in the female, body black or dark brown. Very large species. Acanthacorydalis Weele. Asia.

No tooth on the occiput — 3.

3. Dent distinctly developed — 4.

Dent only slightly indicated by an elevated line near the posterior edges of the quadrangular head — 5.

4. Males mostly with elongate mandibles and longer antennae than the females. Appendices inferiores clubbed, not clawlike. Large forms with brownish grey wings, that are punctate with pale dots. Body pale brown. Corydalus Latreille. America.

Mandibles and antennae equal in both sexes. Appendices inferiores of the ♂ clawlike. No pale dots in the membrane of the wings — 6.

6. Appendices superiores of the ♂ clubbed at the apex. Genitalvalve absent, penis very long. Large forms with dark coloured body and wings. Neoneuromus n. g. Asia.

Appendices superiores of the ♂ not clubbed at the apex. Genitalvalve well developed, penis short. Mediocre forms with pale yellow body and wings. 4 crossveins between radius and radialsector. Neuromus Rambur. Asia.

5. Appendices inferiores clubbed, with a very minute claw at the tip. Appendices superiores acute, not clubbed at the apex. Body and wings as in *Neuromus*. 3 crossveins between radius and radialsector. Chloronia Banks. America.

Appendices inferiores clawlike. Appendices superiores acute or bifurcate. Wings elongate, with darker groundcolour and pale spots. Body pale. Many crossveins between radialsector and radius. Protohermes Weele. Asia.

Appendices superiores bifurcate. Wings broad at the base, narrowed at the tip, very dark brown with creamwhite spots. Body black. Hermes Gray. Asia.

The *Neuromini,* which seem to be more primitive than the *Chauliodini,* have a somewhat less extensive geographical distribution. They are tropical and subtropical and inhabit North- and South America, Japan, Asia and Insulinde. They are absent in Africa, Europe, Australia and New Zealand. The most gigantic species belong to this tribus. The primitive genera are apparently *Neuromus* and *Chloronia,* in which the gonopoda of the ♂ are less complicated and in which no other sexual differences are developed. From *Neuromus* the

asiatic genera *Neoneuromus* and *Acanthacorydalis* can be derived on the one hand, on the other hand the genera *Protohermes* and *Hermes,* which remember more or less the *Chauliodini* in some characters. *Platyneuromus* from Central America seems, by the clawlike appendices inferiores, rather related with the asiatic genus *Neuromus*.

The american genus *Chloronia* is related with *Corydalus* by its gonopoda and seems to be its precursor.

The principal evolution of the tribus is in Asia.

Though the development and biology of *Corydalus cornutus* L. are sufficiently known, of the more primitive genera they are not yet detected, and probably many curious facts are to be discovered in this tribe.

Genus **CORYDALUS** Latreille (1802).

Latreille, Hist. nat. Crust. et Ins., III, p. 290 (1802).

Corydalis Latreille, *loc. cit.,* XIII, p. 44 (1804).

Palisot, Ins. Névropt. Amér. Afrique, tab. I, fig. 1 (1821).

Olivier, Encyclop. Méthod., VII, p. 59 (1825).

Corydalis Burmeister, Handb. Entom., II, p. 950 (1839). — Rambur, Ins. Névropt., p. 440 (1842). — Hagen, Syn. Neur. N. Amer., p. 192 (1861). — Mac Lachlan, Ann. Mag. Nat. Hist. (4), IV, p. 36 (1869). — Davis, Bull. N. York Stat. Mus. 68, Entom. 18, pp. 452, 470 (1903). — Banks, Proc. Ent. Soc. Wash., X, p. 29 (1908).

This genus was by Latreille specially characterized by the corneous elongate mandibles of the male. Rambur has given a more elaborate description, but no other real differences in comparison with his new genus *Neuromus*. Hagen gives no further characters and placed in it many species belonging to other genera of the Neuromini. Mac Lachlan, after having described the ♂ of *C. cephalotes* Rambur under the name of *C. hecate* and after having discovered that this species has no elongate mandibles and that the antennae are of the same shape as in the female, adds (1869) to the distinctive characters : the numerous crossveins in the wings, the dent on the sides of the head, the large size of the body and the fuscous colour of most of the species.

These characters, which are also used by Davis, are still of great value and are sufficient to distinguish the genus from the american genera *Platyneuromus* and *Chloronia*.

Large insects, with strong body and large, elongate, nearly equal wings. General colour luteous to luteo-fuscous. Head broad and flat, nearly quadrangular, with large brown hemisphaerical eyes, 3 distinct ocelli and a distinct short tooth beyond the eyes at each side as in *Neoneuromus*. Mandibles large, not concealed by the labrum. In the male they are, in one and the same species, elongated to long, curved or straight horns, which want nearly every indication of denticulations; in the female they are always denticulate. Antennae moniliform, very variable in length, in the female about as long as the head and thorax taken together, in the male of the same length or as long as the body and then often denticulate.

Prothorax narrow, shorter than the head, somewhat longer than broad, with more or less distinct luteous markings or unicolorous. Meso- and metathorax broad and robust.

Legs long and robust, nearly unicolourous, with short pubescence. Abdomen shorter than the wings, robust. In the ♂ the gonopoda have a pair of long appendices superiores, the form of which changes much in dried specimens, so that alcohol-specimens or dried material boiled with kalium causticum only give a good idea of the normal form in tne living specimen. The appendices inferiores are clubshaped and shorter and less variable in form, but also often deformed in dried examples. The genitalvalve is quadrangular and its form is of interest. It often bears in the middle of its dorsal side, a system of ridges that varies after the individuals. The shape of the penis is of the greatest importance. It is a chitinized wall with two lateral prominencies and has a special form in each species. The tuberculum is situated on the border of the last tergit.

In the female the appendices superiores are very short and inconspicuous. The genitalvalves are also short and without importance for the distinction of the species.

The wings are elongate, large, equal in size and form; the membrane has a luteous or brown colour and is spotted with white points, which vary much in number, size and distribution and are of no or little value to distinguish the species, though often much care has been taken in describing them. The number of the costalveins and that of the crossveins between the radialsectors, the branches of the media etc. are too variable to base any specific character upon.

Also attention must be paid to the circumstance that both sexes, but especially the males, vary much in size and form and in development of antennae and mandibles, as in the coleopterous family *Lucanidae*. As the gonopoda are often deformed by drying and the colour of the body becomes darker or paler by the same process, and the colour and nervature of the wings can differ also very much, it is easy to conceive that many of the described species are only forms of other ones. Only a careful examination of the genitalia and large series of individuals from one and the same locality can give a good idea of a species of *Corydalus*.

Much trouble and desorder for the monographer have been caused by the description as species of such aberrant individuals (cf. *C. cornutus* L.).

The biology and development of *C. cornutus* L. are very well known, cf. DAVIS, *loc. cit.*, p. 473, etc. (1903). Nothing is known about the duration of the larval period. The larva lives in running water and preys on other insect-larvae. It pupates under stones etc. in the neighbourhood of water and emerges after one to two weeks. The imagines live a very short time, the male only three days, the female about eight to ten days. The imagines seem to take no food.

The geographical distribution of the genus extends from Canada in North America to the Argentine Republic. The genus is still unknown from the Antilles, but I know no reason, why it could not be detected there. As many forms have been described as species, there remain only the following as good species, which, with a few exceptions, inhabit each a special territory.

North America and Mexico are inhabited by the type-species of the genus, *C. cornutus* L., which is substituted in South America: by *C. armatus* HAGEN in Columbia, Peru and Venezuela, by *C. batesii* MAC LACHLAN at the Amazon, by *C. nubilus* ERICHS. in Suriname and at the Amazon, by *C. affinis* BURMEISTER in South-East Brazil, by *C. primitivus* n. sp. in Argentina and by *C. cephalotes* RAMBUR in Brazil and Peru. The latter is the most primitive species of the genus and has still some relation with the genus *Pseudoneuromus*.

Less primitive are the following species: *primitivus, nubilus, cornutus, armatus* and *affinis*.

The best distinctive characters are to be found in the genitalia of the males.

The name *Corydalus*, published two years earlier by LATREILLE, must be used for the genus instead of *Corydalis,* which is, though used by nearly all later authors, of later date. It is moreover a homonym of a genus of plants, thus is the changement still more legitimated.

I have not always indicated the measures etc. of each species, because the individuals vary so much in size, that these indications have then no value. I have especially pointed out the

distinctive characters of each species and because nearly all are figured, the measurements can be taken from the figures which have the natural size.

Corydalus cephalotes Rambur.

Corydalis cephalotes Rambur, Hist. Nat. Névropt., p. 441 ♀ (1842). — Walker, Cat. Brit. Mus. Neur., p. 208 (1853).
Neuromus cephalotes Davis, Bull. N. York Stat. Mus. 68, Ent. 18, p. 467 (1903).
= *Corydalis hecate* Mac Lachlan, Journ. of Entom., II, p. 449, pl. 20 (1866).

This is the most primitive species of the genus, the mandibles being short and shaped in both sexes like in the female. The other characters are like in the other species, only the appendices superiores of the ♂ are simply pointed at the apex and not recurved as in most other species (fig. 1). They bear at the innerside, near the base, an obtuse prominency. The appendices inferiores are clubshaped and slightly curved; they are directed inwards. The genitalvalve is trapeziform and the penis (fig. 2) has two hornlike projections which are slightly curved inwards.

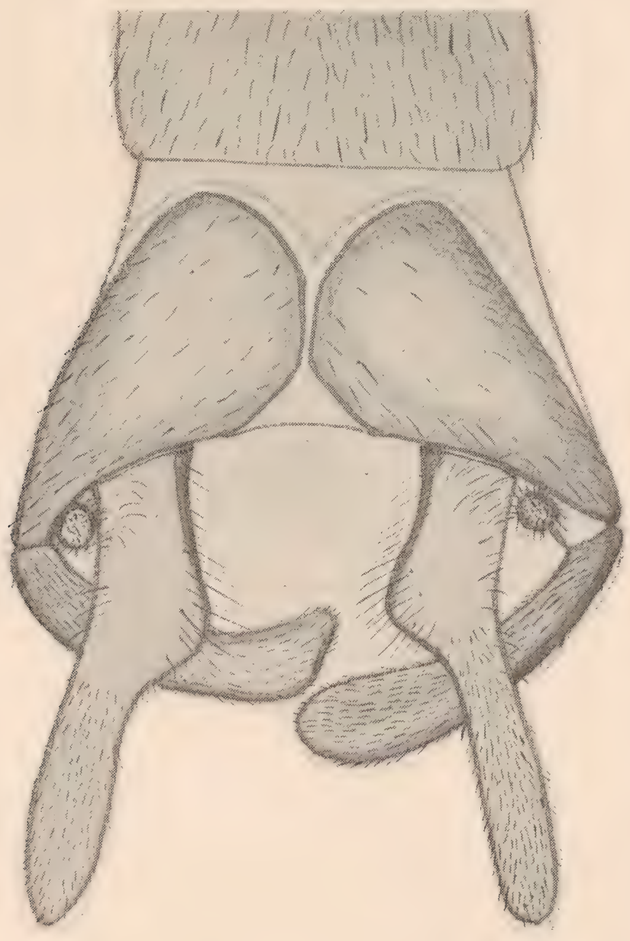

Fig. 1. — *Corydalus cephalotes* Rambur ♂.
Gonopoda, upperside.
(Coll. Selys).

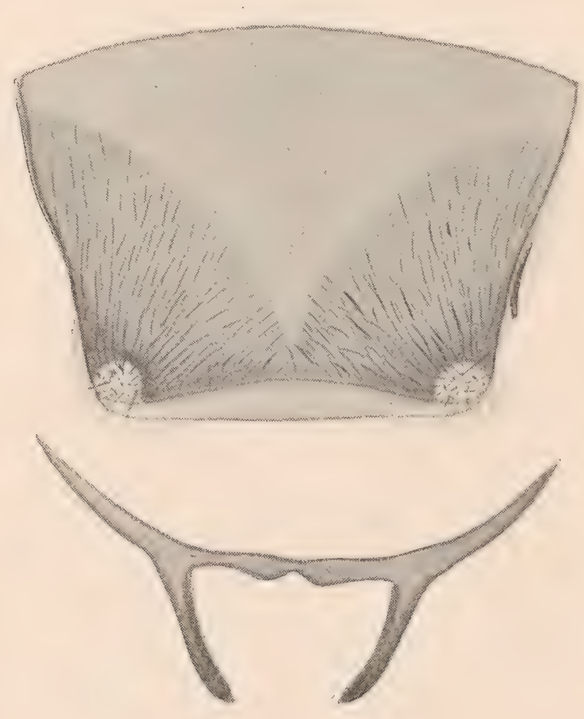

Fig. 2. — *Corydalus cephalotes* Rambur ♂.
Genitalvalve and penis, underside.
(Coll. Selys).

The antennae are slender and in both sexes not longer than in females of other species. The colour varies from yellowish to brown. The head and body are very robust and considerably large and strong in comparison with the relatively short and narrow wings. Their colour is dark brown. The legs are lighter brown. The mandibles are rather short, nearly as long as two thirds of the head; the tips are mostly crossed.

The wings are shaped like in other species, but the front border of the forewings has a long, shallow but distinct incision in the region of the pterostigma, so that their acute, narrow tips seem to be much more narrowed; in the ♀ this incision is less distinct than in the ♂; in the hindwings it is absent in both sexes. The membrane is dark smoky brown ♂, or cinereous ♀,

the longitudinal nervature yellowish brown to brown and the crossveins are all black, those between cubiti, media and radialsector are very distinct, especially those in the proximal half of the forewing. In the hindwing the dark nervature is not so strongly developed, it is only distinct in the apical half.

The white points are small and inconspicuous, and in the hindwing they are absent in the part below the media. The costalveins are black and numerous, nearly as numerous as in *batesii* Mac Lachlan. In the costalarea there are no white points, only traces of them are to be seen in the posterior half of the cells in the female.

Body : ♂ 45-58^{mm}, ♀ 65^{mm}; forewing : ♂ 52-62^{mm}, ♀ 59-66^{mm}; hindwing : ♂ 46-56^{mm}, ♀ 53-60^{mm}; ant. : ♂ 29^{mm}, ♀ ± 28^{mm}; abd. : ♂ 27-30^{mm}, ♀ 30^{mm}; gr. br. of forewing : ♂ 12-18^{mm}, ♀ 18-22^{mm}; gr. br. of hindwing : ♂ 12-18^{mm}, ♀ 22^{mm}; app. : ♂ 5^{mm}.

Habitat : Brazil (Theresopolis) and Peru?

The type of Rambur in the collection Selys is a ♀ with unexpanded, pale-coloured wings; antennae and feet are lost. It bears a label « Brésil » and the indication « Coll. Latreille ». On another label occurs in Dr. Hagen's handwriting « *Corydalis cephalotes* Rambur ». The indication of Rambur wants, but as the specimen is quite agreeing with his description, I cannot doubt that it is the type. On the same label the name *affinis* Burmeister is written by Hagen, but it is stroken out.

In the same collection is a male labelled « Perou », the figure of the genitalparts has been taken after this specimen. It is only somewhat smaller than brazilian specimens, so that the species should occur in a large rank if the locality has been correctly indicated.

In the British Museum I saw a very fine couple from Theresopolis.

Mac Lachlan's figures are very exact, those of the genitalorgans are somewhat schematic. The exact locality of his types was unknown.

In the Paris Museum are a male labelled « Mexique Sallé 1856 » (very probably erroneous), a female from « Columbia, Santa Marta, Fontanier 1853 » and another female from Caracas, Venezuela.

* **Corydalus cornutus** (Linné).

Hemerobius cornutus Linné, Syst. Nat., edit. X, p. 551, n. 14 (1758); edit. XIII, t. V, p. 2639 (1793).

Raphidia cornuta Linné, Syst. Nat., edit. XII, p. 916, n. 3 (1767).

Hemerobius cornutus Linné, de Geer, Mém. Ins., III, p. 559, n. 1, pl. 27, fig. 1 (1773). — Fabricius, Spec. Ins., I, p. 392, n. 1 (1781); Mant. Ins., I, p. 246, n. 1 (1787); Entom. Syst., II, p. 81, n. 1 (1793).

Corydalus cornutus Latreille, Hist. nat. Crust. et Ins., III, p. 290 (1802).

Corydalis cornuta Latreille, *loc. cit.*, XIII, p. 44, n. 1 (1804). — Palisot, Ins. Névropt. etc., pl. I, fig. 1 (1821). — Olivier, Encyclop. Méthod., VII, p. 59 (1825). — Cuvier, Icon. règne animal, edit. Masson, tab. 104 (1836). — Burmeister, Handb. Entom., II, p. 950, n. 1 (1839).

Corydalus cornutus Haldeman, Journ. Acad. Boston, 1848, p. 158, t. I-III (1848).

Corydalis cornuta Hagen, Syn. Neur. N. America, p. 192 (1861); Ent. Soc. Philad. Proc. II, p. 181 (1863). — Walsh, Ent. Soc. Philad. Proc., II, p. 265 (1863). — Banks, Transact. Amer. Ent. Soc., 19, p. 357 (1892). — Banks, Ins. New Jersey, p. 52 (1900) metam. fig. — Needham, New York Stat. Mus. Bull. 47, p. 550, pl. 28 (1901). — Wickham, Canad. Entomol., XXXV, p. 207 (1903). — Davis, New York Stat. Mus. Bull. 68, Entom. 18, pp. 473-476, 478 (1903). — Banks, Trans. Amer. Ent. Soc., 1907, p. 21 (1907). United States.

Forma I.

Corydalis crassicornis Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 233, pl. VIII, fig. 2 (1867). — Davis, *loc. cit.*, p. 479 (1903). — Banks, *loc. cit.*, p. 21 (1907). Texas.

Forma II.

Corydalis inamabilis Mac Lachlan, *loc. cit.*, p. 235, pl. VIII, fig. 3 (1867). — Davis, *loc. cit.*, p. 477 (1903). — Banks, *loc. cit.*, p. 21 (1907). Texas.

Forma III.

Corydalis cognata Hagen, Syn. N. Amer. Neur., p. 193 (1861). — Banks, Trans. Amer. Ent. Soc., XIX, p. 357 (1892); *loc. cit.*, p. 21 (1907). — Davis, *loc. cit.*, p. 479 (1903). Texas.

Forma IV.

Corydalis lutea Hagen, *loc. cit.*, p. 193 (1861). — Davis, *loc. cit.*, p. 480 (1903). Mexico.

Forma V.

Neuromus pallidus Davis, *loc. cit.*, p. 470, pl. 52, fig. 2 ♂ (1903). Mexico ?

Forma VI.

Corydalis texana Banks, Journ. N. York Ent. Soc., XI, p. 239 (1903); *loc. cit.*, p. 21 (1907). Texas.

This well-known species, the type of the genus, is characterized by the luteo-fuscous to luteo-cinereous colour of the body, on which the luteous pattern of head and prothorax is almost always distinctly indicated. I saw however some individuals in which the colour was luteous and the pattern nearly invisible. Head and thorax are always broad and robust. Legs nearly of the same colour as these parts or slightly paler, with the annulations and the four apical tarsal-articulations black.

Wings cinereo-hyaline, the forewings with many pale points in the cells and in the costal-field, but in pale individuals they are very inconspicuous or absent. Nervature yellow and brown, the crossveins black or brown, those of the forewings very dark. The costalveins pale in the middle and not very numerous, standing rather far from one another.

The gonopoda of the ♂ (fig. 3) consist of a pair of appendices superiores which are normally slightly curved to one another, with the tips pointed and bent forwards; the base is not enlarged. The appendices inferiores are clubshaped and somewhat curved outwards. The tuberculum is small. The genitalvalve is rectangular; at the dorsal side it bears a complex of longitudinal chitinous elevations, the number and form of which is very variable. The penis (fig. 4) is developed as a semicircular chitinous ring, which has two mammillary prominencies.

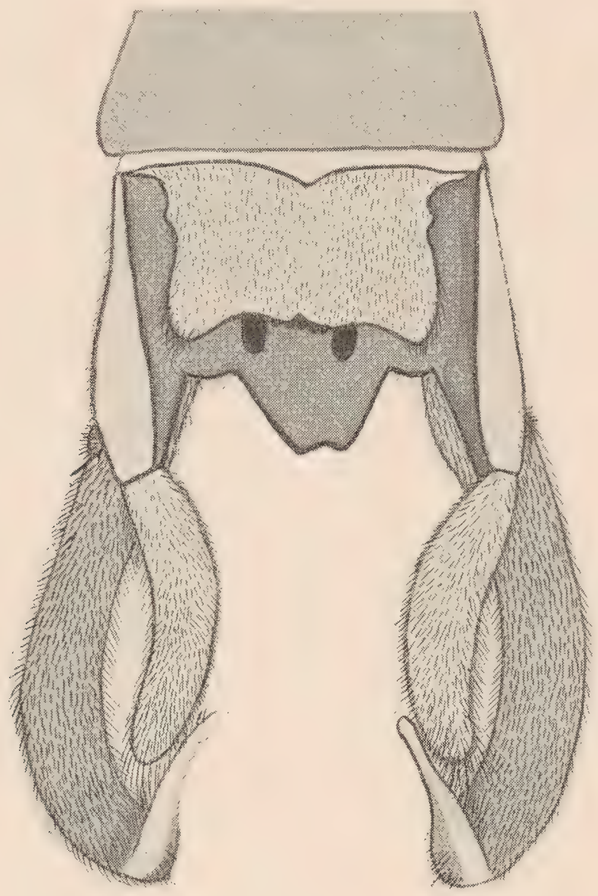

FIG. 3. — *Corydalus cornutus* L. ♂.
Gonopoda, underside.
(Coll. Selys).

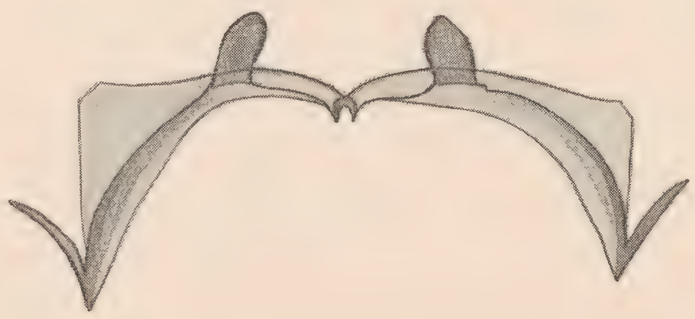

FIG. 4. — *Corydalus cornutus* L. ♂.
Penis, underside.
(Coll. Selys).

In dried specimens the gonopoda are often very strongly curved and bent, so that they get an aspect very different from that of the figure. When boiled in caustic kalium of 30 % they soon recover their natural form. They vary in size as much as the mandibles and antennae of the ♂. The gonopoda of the ♀ (figs. 5-6) remember somewhat those of *Sialis*. The appendices superiores are very short, cruciform and with a small tuberculum. The genitalvalves are also very short but characteristic in their form. I examined specimens from North America and Mexico, but did not find any difference.

The variation in size, antennae, number of costalveins etc., is astonishing. I saw forms of the size of the largest *Pseudoneuromus*-species to forms of more than 16 c. m. wing-expanse.

Its anatomy, biology and metamorphosis are the best known of nearly all species of this family.

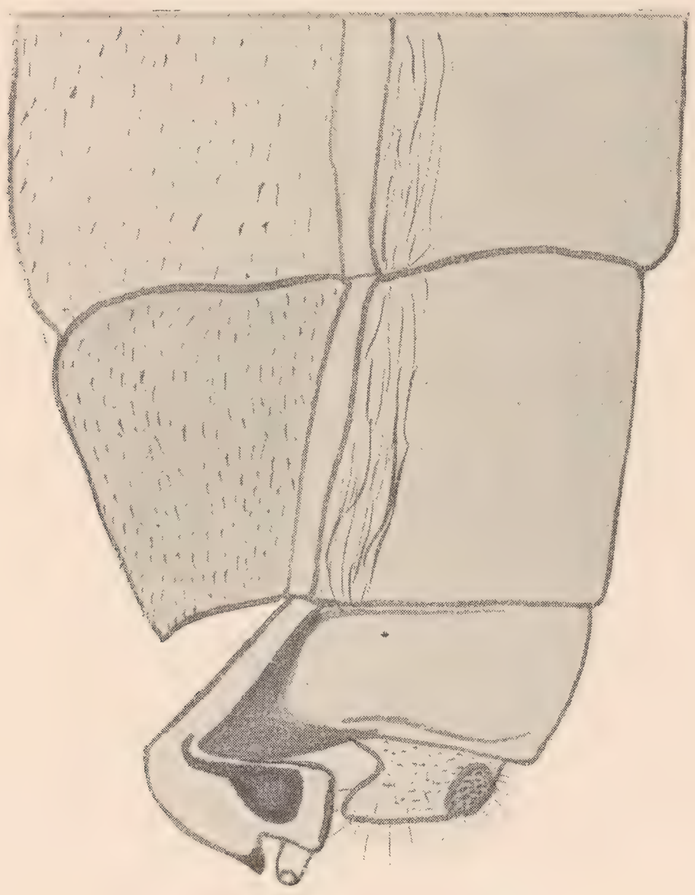

FIG. 5. — *Corydalus cornutus* L. ♀.
Gonopoda of the female, lateral view.
(Leyden Museum).

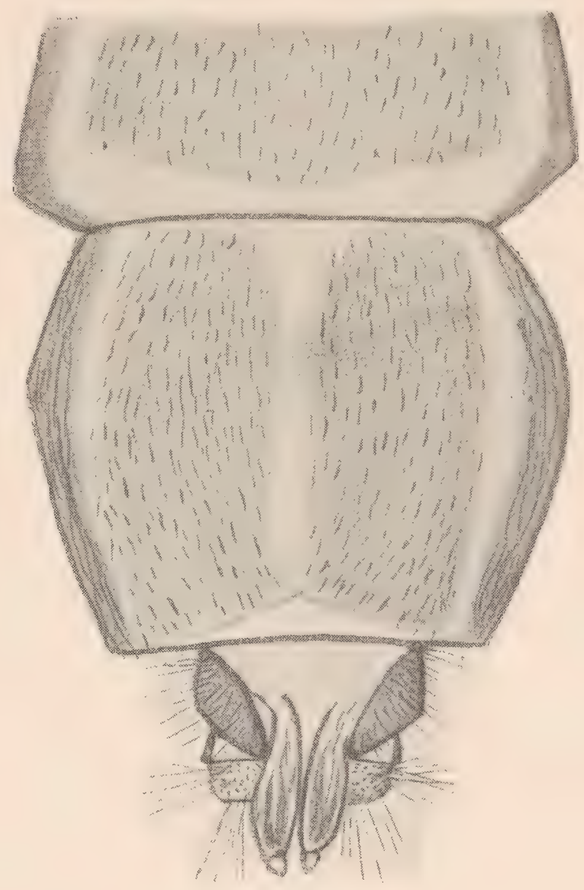

FIG. 6. — *Corydalus cornutus* L. ♀.
Gonopoda, underside.
(Leyden Museum).

The geographical distribution is very large. It is the most boreal form and it goes from Canada to Texas and Mexico, especially in the eastern- and south-western states. I examined the gonopoda of an extensive series of males of different forms from Mexico and other localities, but I could not find any specific difference. I regard therefore the following species only as forms, the same variation being repeated in other species, as *primitivus*, *peruvianus* and *armatus,* of which I also saw large series.

Corydalus crassicornis (Mac Lachlan).

I saw a photo of the type from Texas and examined specimens from Mexico in the collection of the Paris Museum and of SELYS, which do not differ from it. It is the form of the ♂ with denticulate antennae. The head and mandibles are also strongly developed, and the gonopoda are not deformed by drying as is shown by MAC LACHLAN's sketchfigures.

Corydalus inamabilis (Mac Lachlan).

This is only a smaller form of *crassicornis*. It is also from Texas and has shorter antennae, which are also denticulated. The principal difference, indicated by MAC LACHLAN, lies in the gonopoda, which are however extremely deformed by drying. I saw a photograph of the type and some specimens from Mexico in the various collections.

Corydalus cognatus (Hagen).

This has also been described after a small ♂ in which the mandibles are much shorter and the antennae quite as in the female. I examined a photograph of the type and some specimens in DE SELYS' collection, but they vary much and no specimen is like the other. The type is from Texas. I also saw specimens from Mexico.

Corydalus luteus (Hagen).

This is the form of the ♂ which has the mandibles very short and about as long as in the female. The colour of the body is luteous in HAGEN's types, one of which is in DE SELYS' collection. They are known from Mexico.

Corydalus pallidus (Davis).

The type is also a ♂ with very short mandibles and deformed gonopoda. The locality is unknown, but it is presumed to come from Mexico.

Corydalus texanus (Banks).

This form is described after an extremely small female, which comes in size nearest to *pallidus*. It is also very pale and there is but one white point in each cell of the costalfield in the forewings. I examined a photograph of the type, which comes from Texas, and saw specimens from the same country, which pass into the typical form (Leyden Mus.).

The number of described forms could easily be augmented. In other species such forms have also been described as distinct species. It is however an analogous case as in the *Lucanidae,* where the sexual dimorphism causes much variation in the ♂, so that many forms of one species have been described and were a long time regarded as genuine species.

In the collection SELYS are typical ♂♂, with long mandibles and long, thick, untoothed antennae, and ♀♀ from the collection LATREILLE and A. FITCH from the United States. The ♂, after which PALISOT's description and drawing are made, is also present. From Mexico there is a series of six specimens (1 ♂, 5 ♀♀). The form *cognatus* HAGEN is represented by two ♂♂ from Mexico, one ♀ indicated Brazil and one ♀ from Guatemala, GISQUIÈRE. The form *luteus* HAGEN is represented by one ♂, indicated « Mexique SALLÉ » and labelled by HAGEN. There are two ♀♀ without localities, one of them labelled by RAMBUR, both labelled by HAGEN as *Corydalis cornuta* RAMBUR nec LINNÉ, but they certainly belong to this species.

Corydalus armatus (Hagen) (Planche I, fig. 4).

Corydalis cornuta RAMBUR, Hist. Névropt., p. 440 (1842) part. (Columbia). — WALKER, Cat. Brit. Mus. Neur., p. 208 (1852).

Corydalis armata HAGEN, Syn. N. Amer. Neur., p. 321 (1861). — DAVIS, New York State Mus., Bull. 68, Ent. 18, p. 482 (1903) (Columbia, Venezuela).

Corydalis peruviana DAVIS, *loc. cit.,* p. 480 (1903) (Peru).

This species, which is nearly related to the large mexican specimens of *cornutus* L. (*crassicornis* MAC LACHLAN), is distinguished by its longer, narrower and more pointed wings. The membrane of the forewings is luteous brown-grey in the ♂, darker grey in the ♀, with not

very numerous small white points in the cells. These points are absent in the hindwing, which is paler luteous or grey, according to the sex. The costal area of the forewing is uniformly luteous or grey, without white points or seldom with traces of them. The costalveins are more numerous and denser than in *cornutus* L., quite like the other nervature. The longitudinal nervature is from yellow to brown, the crossveins are black, brown or yellow in the hindwings.

The colour of the body etc. varies from luteous to brown. The markings on the occiput and pronotum are not of a paler colour, generally so characteristic in *cornutus,* but of the same colour and therefore only visible as slight impressions. The legs have no dark annulations and vary in colour from luteous to brown.

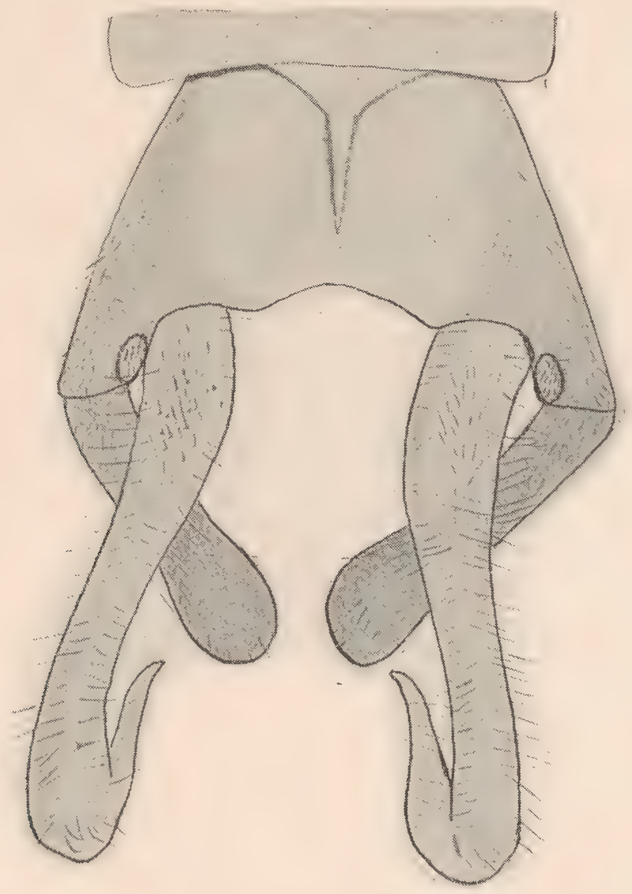

FIG. 7. — *Corydalus armatus* Hagen ♂.
Gonopoda, upperside.
(Leyden Museum).

The genitalia of the male (fig. 7) are very similar to those of *cornutus* L., only the papillae of the penis are about twice longer and the appendices superiores are a little enlarged inwardly at the base.

Habitat : Columbia, Peru, Venezuela.

I saw many specimens of this common species, which is nearly related to *cornutus*. I found the same forms of males and in the females the antennae vary from luteous to blackish brown. Probably this form only occurs in the mountainous regions of the northern part of South America. It is the largest species of the genus and I saw specimens of 16 c. m. wing-expanse.

I have not seen the type-specimens of RAMBUR from Columbia, named by HAGEN *armata* without describing them. They must be in Paris, but they were not among the materials I examined from that museum. WALKER's types are identical with this form; I examined them in 1906.

C. peruviana DAVIS is also the same species, the differences enumerated by him are only individual. I examined a photograph of his type, which is quite identical with specimens in the Leyden Museum from Chozica and Chanchamayo (coll. v. d. WEELE). Many specimens are imported from Venezuela, Merida. In the collection SELYS is a series of four males and sixteen females from that locality.

[**Corydalus Batesi** (Mac Lachlan)] (Planche I, fig. 1).

Corydalis Batesi Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 232, tab. VIII, fig. 1 (1868). — Davis, Bull. New York State Mus., 68, Ent. 18, p. 481 (1903).

I only saw a photograph of the type of this species, that much remembers *armatus* and *nubilus* and seems to be somewhat intermediate. It may be a large and darkly coloured specimen of the latter, as there is in the Leyden Museum a similar specimen, collected in Surinam on the Saramacca river by Dr. P. J. de Kock in 1903. This specimen, also a ♀, is however badly conserved, as it has been at first in alcohol and then dried in the bottle.

So long as the male remains unknown, there is but little to say about the specific value of this form, that is distinguished from *nubilus* by its larger size, which equals large specimens of *armatus*, by the dark suffused first row of crossveins in the forewing and by the dark proximal part of the apical area of the forewings.

The fatherland is Ega at the Amazon, and the type is in Mac Lachlan's collection.

Corydalus affinis (Burmeister) (Planche I, fig. 3).

Corydalis affinis Burmeister, Handb. Entom., II, p. 951, n° 2 ♀ (1839). — Rambur, Hist. Névr., p. 441 (1842) part. — Walker, Cat. Brit. Mus. Neur., p. 208 (1853). — Hagen, Syn. N. Amer. Neur., p. 321 (1861) part.

This species remembers much *C. cornutus* by the dark coloured and very richly spotted wings, but the nervature is much more dense, especially the costalveins, which are much more numerous than in *armatus* also, and can mount to more than 50 in the forewing.

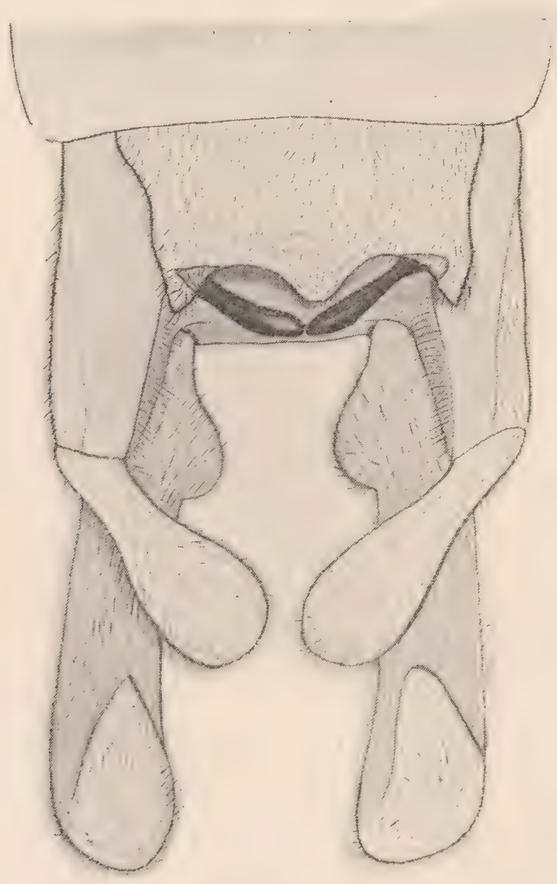

Fig. 8. — *Corydalus affinis* Burmeister ♂.
Gonopoda, underside.
(Leyden Museum).

The form of the wings is rather that of *armatus* and the colour of the membrane and its pattern is very variable, varying from grey to dark grey, with numerous white dots, which are exceedingly variable in size and arrangement.

Body and legs luteous to fuscous. Antennae brown.

The genitalia of the ♂ (fig. 8) are characterized by the lobe of the innerbase of the

appendices superiores, which is more distinct than in *armatus*. The tips of the appendices superiores are acute and curved ventralwards in the same way. The appendices inferiores are shorter and more club-shaped. The genitalvalve has two round incisions at the hindborder and

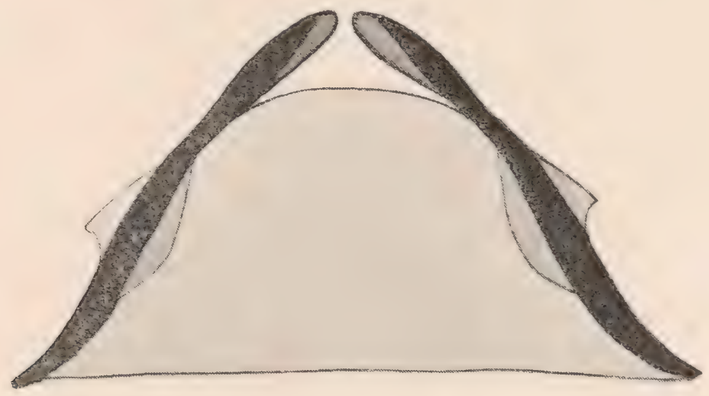

Fig. 9. — *Corydalus affinis* Burmeister ♂.
Penis.
(Leyden Museum).

the penis (fig. 9) is very characteristic, as it consists of two oblique chitinous bars, which nearly touch their tips, that are free and bear an excavation at the inside. In dried specimens these parts are also mostly visible.

Habitat : East Brazil, Bahia to Rio Grande do Sul.

Burmeister's description is very short and not very clear and has misled all authors. Rambur suggested that his *cephalotes* was the same species, and Hagen and also Davis regarded it as synonymous with this form. Davis however gave Rambur's name the priority, which was still more incorrect. I examined a good photograph of Burmeister's type, which is a small female with more than 50 costalveins in the forewing. The white dots are not numerous in the forewings and absent in the hindwings. Its fatherland is South America, but probably it is from Bahia, as many south-american insects, described by Burmeister as brazilian, are from this country.

I saw all forms of the ♂ from localities between Bahia and Rio Grande and numerous females. In the collection Selys are one female from Espirito Santo, ex coll. H. Fruhstorfer, one ditto from Santa Catherina and a third labelled only Cl. 3, and one ♂ with short mandibles and antennae as in the ♀, with the indication « Brésil ».

[**Corydalus nubilus** (Erichson)] (Planche I, fig. 8).

Corydalis nubila Erichson, Schomburgk's Reise in Guyana, III, p. 586 (1848). — Hagen, Syn. N. Amer. Neur., p. 321 (1861). — Davis, Bull. New York State Mus., 68, Ent. 18, p. 482 (1903).

Nearly related to, but much smaller than *armatus;* a rather feeble species.

Body luteous to brown, with luteous legs; tips of mandibles, palpi and antennae except the three luteous basal joints, deep shining black. Mandibles of the ♂ elongate, but only slightly curved, about as in *primitivus*.

Wings elongate-ovate, forewings of a pale dusky brown colour, which stops along the cubitus and contains but a few large white points. In the middle of the wing is a hyaline yellowish miror-patch, that begins at the radius about at the first crossvein and increases obliquely distalwards to the cubitus, where it ends. It is often indistinct in pale individuals, or it is small and contains dark spots. The hindwings are hyaline, only the tips are a little darkened. The longitudinal nervature is yellow, the crossveins are deep black, especially the costalveins are very dark in both wings, they are numerous in the forewings.

The genitalia of the ♂ (fig. 10) are remarkable by the long and slender appendices superiores, which are not dilated at the base, nor curved downwards at the apex, and form an elongated forceps.

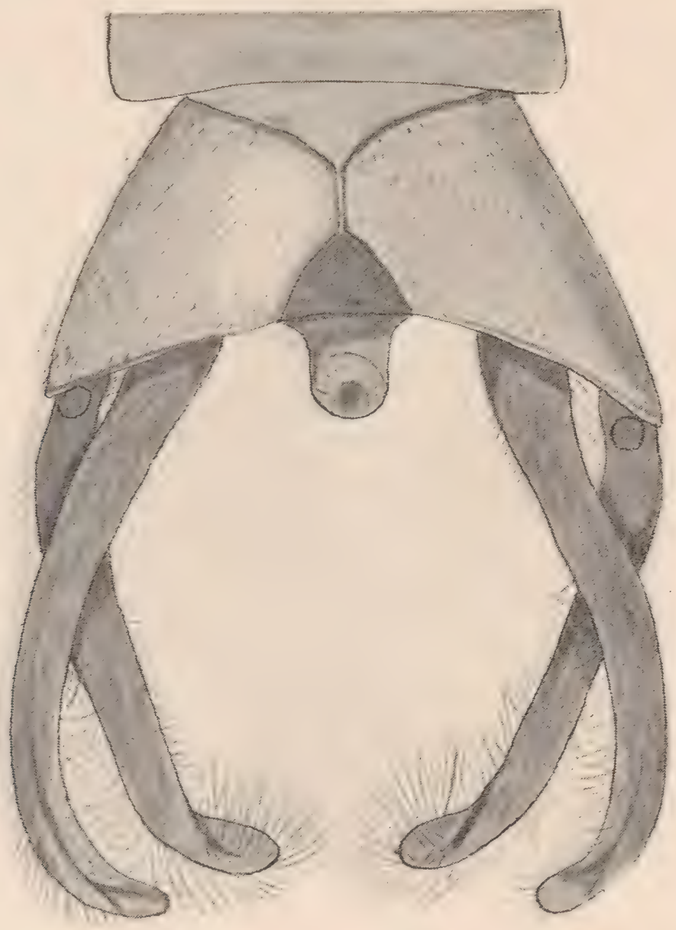

FIG. 10. — *Corydalus nubilus* Erichson ♂.
Gonopoda, upperside.
(Paris Museum).

The appendices inferiores are nearly as long as the appendices superiores and of the same form. The

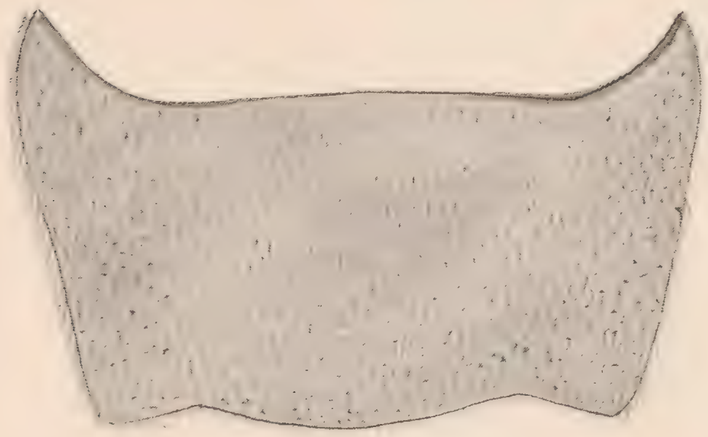

FIG. 11. — *Corydalus nubilus* Erichson ♂.
Genitalvalve, underside.
(Paris Museum).

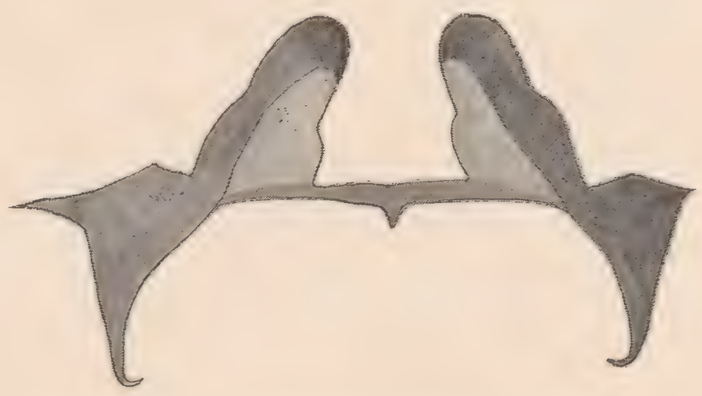

FIG. 12. — *Corydalus nubilus* Erichson ♂.
Penis, underside.
(Paris Museum).

genitalvalve (fig. 11) is rectangular, the penis (fig. 12) has two remarkable, long prominencies, that remember somewhat *C. affinis* BURM.

Habitat : Guyana, lower Amazon, Venezuela.

This species, which has about the same size as *primitivus,* has a much feebler form, because the body is much more slender.

I saw but a few specimens, viz. : a male from « Environs de Saint-Georges, Oyapock Saut Coachitane, Guyane française, F. GEAY 1900 », one female « Guyane Haut-Carsevenne, F. GEAY 1898 » both in the Museum of Paris. One female from Pará, Brazil, collected by GOELDI, and another female from Caracas, Mr. VAN LANSBERGE, are in the Leyden Museum. I saw in the collection of the Paris Museum, another female that is labelled : Chambireyacù près Yurimaguas (Huallaga-Pérou) M. DE MATHAN, juin-août 1885, Coll. R. OBERTHUR 1906). Probably this specimen has been incorrectly labelled.

I have not seen the type, neither a photograph of it, but after the original description there is no doubt about the identity of the species. ERICHSON's description seems to be made after a female, but he also indicates the male *mit langen abwärts gebogenen Aftergriffeln*. Probably the male-type has short mandibles.

Corydalus primitivus Weele (Planche I, fig. 2).

Corydalus primitivus WEELE, Notes Leyden Mus., XXX, p. 251 (1909).

This species remembers *C. affinis* and *cornutus* in the form, colour and pattern of the wings. The nervature however is less dense than in *affinis,* but somewhat more dense than in *cornutus,* especially the costalveins are relatively more numerous.

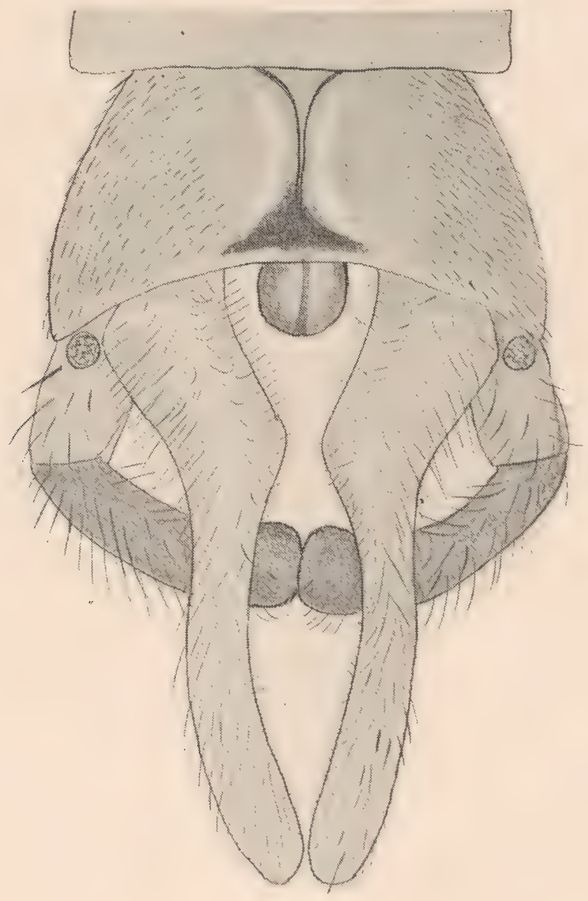

FIG. 13. — *Corydalus primitivus* Weele ♂.
Gonopoda, underside.
(Leyden Museum).

The membrane of the forewings is grey and shows in the cells numerous white spots, surrounded with darker grey. The hindwings are mostly uniformly grey, but in strongly coloured specimens there are often similar white dots in the apical area. There are however also individuals in which the white dots are less numerous and not distinctly surrounded with grey.

Body, legs etc. of a luteous to luteous brown colour. Antennae varying from luteous to blackish brown, but mostly blackish brown, only the three basal joints yellow.

Mandibles of the ♂ mostly short, but when enlarged they are nearly straight and never so strongly curved as in *armatus* or *cornutus*. The genitalia of the ♂ are rather primitive, as the appendices superiores (fig. 13) are straight, nearly parallel, not forming a forceps, the tips straight, not curved downwards, and the base with a dilatation about as in *armatus*. The appendices inferiores are long and clubshaped. The genitalvalve is quadrangular, with prominent posterior edges. The penis has lobes about as in *nubilus* ERICHSON.

Habitat : Argentine Republic.

Coll. SELYS : 1 ♀ Tucuman.

A series of three ♂♂ from my collection, one ♂ and two ♀♀ in the Leyden Museum and one ♀ in DE SELYS' collection, all from Tucuman, purchased from the London Naturalist W. F. H. ROSENBERG. The males are developed in the same forms as in *cornutus*.

Genus **ACANTHACORYDALIS** (Weele 1907).

Weele, Notes Leyden Mus., XXVIII, p. 228 (1907).

Banks, Proc. Ent. Soc. Wash., X, p. 29 (1908).

This genus differs from *Corydalus* Latreille by the thorn on the head, the toothed mandibles of the male and the thin and short antennae which are of the same shape and length in both sexes. The species are as large or larger than the largest *Corydalus*-forms and belong to the largest recent insects.

Habitat : Asia.

[*A. asiatica* (Wood-Mason)], Proc. Zool. Soc., 1884, p. 110, t. 8 (1884). — Mac Lachlan, Ent. Mo. Mag., 25, p. 113 (1888). — Weele, *loc. cit.,* p. 230, fig. 1 (1907).
Habitat : Assam, Naga Hills.

[*A. orientalis* (Mac Lachlan)], Trans. Ent. Soc. London, 1899, p. 281, taf. IX (1899). — Weele, *loc. cit.,* p. 230, fig. 2 (1907). Habitat : West China.

[*A. Kolbei* Weele], *loc. cit.,* p. 230, figs. 3, 4, 5, 6, t. 2 (1907).
Habitat : West China, Omei Shan.

I saw a small female-specimen from Assam, W. F. Badgley, in the collection of the British Museum. It differs in the colour of the wings, which are nearly hyaline; the costalveins are simple, the head has above larger black spots, but the colour and pattern of the pronotum are about the same as in *Kolbei,* so that I must held it for this species, as these pattern are constant in the asiatic species, so far I saw specimens of them. Without the ♂ of this Assam-form, it is impossible to decide this question with certainty.

[*A. Fruhstorferi* Weele], *loc. cit.,* p. 233, t. 3, fig. 1 (1907).
Habitat : Tonkin.

Genus **PLATYNEUROMUS** (Weele 1909).

Weele, Notes Leyden Mus., XXX, p. 252 (1909).

The unique species of this genus remembers by its large size much the asiatic *Neoneuromus*-species. It is distinguished from all other genera by the very large, flattened, broad head, the sides of which have each *two* dents, the posterior of which (the homologon of that of the other genera) is the smallest, and the anterior one (which is only developed in the other genera as a right angle behind the eyes) is here a very acute prominency, reaching till beyond the eyes.

In the gonopoda of the male it remembers *Neuromus* by the long bandlike appendices superiores, but the appendices inferiores are relatively very short, clawlike and strongly curved. The penis remembers that of *Pseudoneuromus,* as it consists of two small, soft, hairy setae.

The wings have the form of those in the other genera, but their coloration remembers somewhat that of *Neoneuromus*.

Corydalis soror Hagen is the type of the genus; it inhabits Mexico and the Isthmus-states of America.

* **Platyneuromus soror** (Hagen) (Planche II, fig. 12).

Corydalis soror Hagen, Syn. Neur. N. Amer., p. 193 (1861).

Neuromus soror Hagen-Davis, Bull. N. York Stat. Mus. 68, Entom. 18, p. 467 (1903). — Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908).

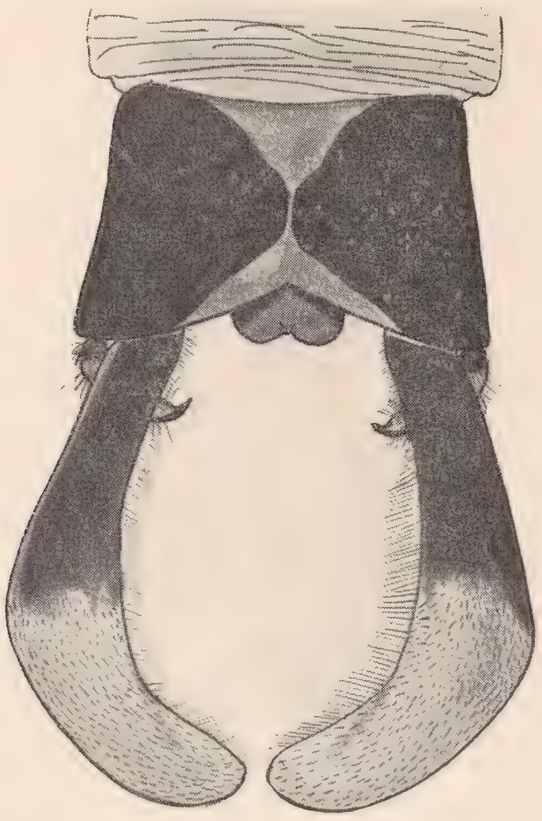

Fig. 14. — *Platyneuromus soror* Hagen ♂.
Gonopoda, upperside.
(Coll. Selys).

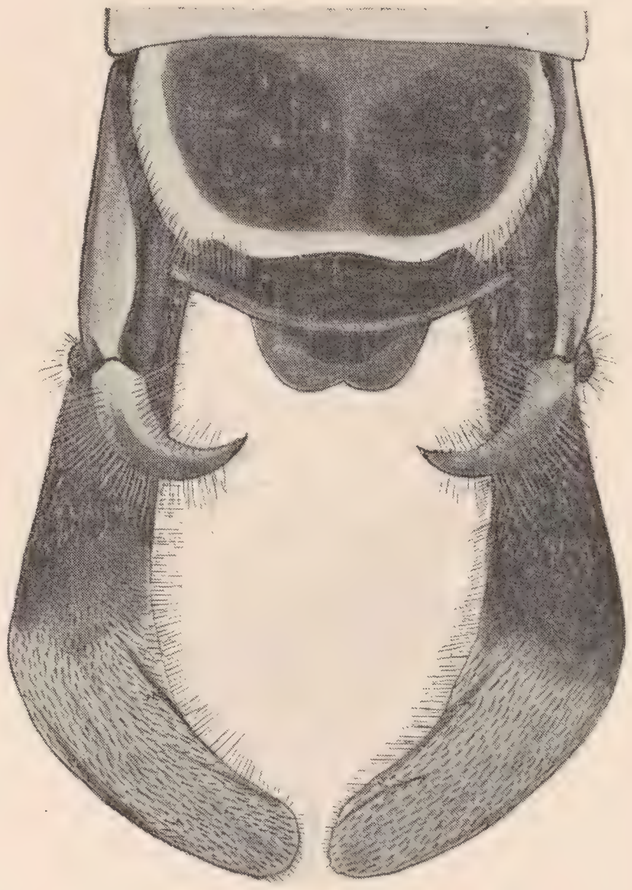

Fig. 15. — *Platyneuromus soror* Hagen ♂.
Gonopoda, underside.
(Coll. Selys).

Colour luteous. Head luteous, with the sides behind the eyes somewhat darker brown.

Fig. 16. — *Platyneuromus soror* Hagen ♂.
Genitalia, lateral view.
(Coll. Selys).

Fig. 17. — *Platyneuromus soror* Hagen ♂.
Penis.
(Coll. Selys).

Mandibles black. Eyes yellowish to brown. Ocelli luteous. Underside of the head luteous.

Prothorax as long as broad, half as broad as the head. Underside luteous. Upperside luteous in the middle, the sides broadly darkbrown. Meso- and metathorax similarly coloured. Abdomen blackish. Gonopoda of the male see figs. 14-17.

Wings long and relatively narrow-elliptical, membrane hyaline, the nervature luteous, the costalveins in both wings and all the crossveins before the cubitus in the forewings brown or blackish brown. The membrane in this part is clouded with indistinct greyish spots; one of them can form a short, distinct grey band between the radius, the origin of the radialsector and the cubitus superior in more mature specimens, especially in the males.

Body : ♂ 37-40^{mm}, ♀ 32-45^{mm}; forewing : ♂ 45-50^{mm}, ♀ 35-62^{mm}; hindwing : ♂ 40-45^{mm}, ♀ 31-56^{mm}; abd. : ♂ 20-23^{mm}, ♀ 17-20^{mm}; gr. br. : ♂ 15-17^{mm}, ♀ 11-21^{mm}; gr. br. : ♂ 15-17^{mm}, ♀ 11-21^{mm}; app. : ♂ 5^{mm}.

Habitat : Mexico, Guatemala and Honduras.

I examined a series of two ♂♂ and two ♀♀ from Mexico, collected by GALLÉ and GIESBREGT, a couple from Guatemala in the collection SELYS and one very small ♀, measuring in wing-expanse the half of normal specimens, from Honduras. The latter specimen is in the Zürich Museum. One of the Guatemala-specimens is a cotype, because it is labelled by Dr. H. A. HAGEN himself « *C. soror* HAGEN ».

Genus **NEONEUROMUS** (Weele 1909).

WEELE, Notes Leyden Mus., XXX, p. 252 (1909).

This remembers much the genus *Neuromus,* but, though it is nearly related with it, it differs in some important characters, which make a separation necessary, as I have indicated already in the Notes from the Leyden Museum, XXVIII, p. 237 (1907). The distinctive characters are specially developed in the genital organs of the male. The appendices superiores are clubshaped, the genitalvalve wants and the penis is developed into a very long, obtusely pointed plate, of which the tip projects between the superior appendices.

The colour of the body varies from yellowish *(sikkimmensis)* and from red to black (other species); the latter show often a yellowish colour in immature stadia. The wings are generally much darker coloured than in *Neuromus,* thus remembring those of *Acanthacorydalis* and *Protohermes*.

The genus is restricted to the tropical part of the Asiatic continent. The largest species of this tribus belong to it.

Type of the genus is : *Neuromus fenestralis* MAC LACHLAN.

[**Neoneuromus sikkimmensis** (Weele)].

Neuromus sikkimmensis WEELE, Notes Leyden Mus., XXVIII, p. 237, figs. 8, 9 (1907).

This species, of which hitherto only two males are known, forms in its general aspect a transition to *Neuromus,* because its colour and size are those of the species of that genus.

The tibiae and tarsi are wholly black as in *intimus*. The colour of the body is the same, but on each side of the dorsum of the prothorax a narrow black streak is present, which can be interrupted before the middle.

The wings have a light smoky membrane and the costa of the forewings is black, yellow in *intimus* and *testaceus*, and all the costalveins are darkbrown to blackish; in the cited species they are yellowish in the pterostigma-region.

In the hindwings the costa is dark brown and the costalveins too are dark brown. The apical part is light smoky, the rest more hyaline. I presume that specimens more mature than the two I examined, have the wings similarly coloured as in *latratus*, etc., because immature specimens of the latter much resemble the types of *sikkimmensis* in coloration.

As to the gonopoda it is remarkable that the chitinous plates that I believed to be (*l. c.*, p. 238) the rests of the genitalvalve, are the sternit of the penultimate segment, so that the genitalvalve fails and is substituted by the enormously developed penis.

Body : ♂ 30mm; forewing : ♂ 42-46mm; hindwing : ♂ 39-41mm;
abd. : ♂ 10mm; gr. br. : ♂ 14-15mm; gr. br. : ♂ 14-15mm;
app. : ♂ 3mm.

Habitat : India.

This species occurs in Sikkim (type, ♂, of the Berlin Museum) and in Assam. From the latter locality I saw, in the collections of the British Museum, a male of which the antennae are broken off and which was collected by W. F. BADGLEY 1906.

[**Neoneuromus fenestralis fenestralis** (Mac Lachlan)].

Neuromus fenestralis MAC LACHLAN, Ann. and Mag. Nat. Hist. (4) IV, p. 42 (1869). — WEELE, Notes Leyden Mus., XXVIII, p. 241 (1907).

This closely allied species is easily to distinguish from the foregoing, by having about twice its size; moreover the wings are longer and narrower, and of a dark smoky brown colour with hyaline spots in some cells. The colour of the body varies from redbrown to black.

Colour of the body varying from redbrown with black sides of head and thorax to wholly black. Antennae black. Wings long and narrow, nervature black. Membrane varying from light smoky brown to blackish brown, in the forewings darker than in the hindwings. Costal-area hyaline, the costalveins black, the pterostigmatical region also smoky brown. The cells between radius and radialsector have a hyaline spot in the middle. In the hindwings the basal half is wholly hyaline, but in the forewings it is smoky brown round the crossveins, so that the largest part of most of the cells is hyaline. There is a pyramid-shaped, hyaline spot, formed by three hyaline cells laying between the radialsector, media and cubitus superior, and a much narrower similar one, parallel with it, nearer to the hindborder.

The gonopoda of the male recall to mind those of *sikkimmensis,* but they are wholly black. The appendices superiores are incurved at the tip. The appendices inferiores are of the same form as those of *sikkimmensis*. The penis is long and black, the tip is straightly cut off, and the underside has two long and shallow longitudinal impressions. There are no traces of the genitalvalve.

Body : ♂ 50mm, ♀ 60mm; forewing : ♂ 50mm, ♀ 65mm; hindwing : ♂ 45mm, ♀ 60mm;
abd. : ♂ 30mm, ♀ 30mm; gr. br. : ♂ 17mm, ♀ 21mm; gr. br. : ♂ 19mm, ♀ 23mm;
app. : ♂ 4mm.

Habitat : India.

This species occurs in Darjeeling and in Sikkim. I examined only a few specimens, viz. the types, 2 ♂♂, and some other ♂♂ from Darjeeling in the British Museum, and a ♀ from Sikkim in the Berlin Museum. The following form is a subspecies of it.

[**Neoneuromus fenestralis Maclachlani** (Weele)].

Neuromus fenestralis Maclachlani WEELE, Notes Leyden Mus., XXVIII, p. 241, fig. 14 (1907).

This form is in general appearance quite the same as *fenestralis,* but it differs from it in the gonopoda of the male.

The appendices superiores are not incurved at the apex, but here an oval longitudinal impression is present. The penis ends in two shortly curved lobes and it has a short, shallow, longitudinal impression at the apex.

The measures are the same as in *fenestralis,* and as I saw also light coloured specimens, the differences in the colour of body and wings are not constant and not useful for there separation. It is the northern form and it occurs in Western China, Omei Shan. I saw a large series of it in various collections. In the collection SELYS is a male, purchased under the wrong name *Chauliodes sinensis* WALK.

[**Neoneuromus latratus latratus** (Mac Lachlan)] (Planche II, fig. 9).

Neuromus latratus Mac Lachlan, Ann. and Mag. Nat. Hist. (4) IV, p. 43 (1869). — Weele, Notes Leyden Mus., XXVIII, p. 238 (1907). — Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908).

I separate this form from *fenestralis* as a species, as it differs not only in the gonopoda of the male but also in the wings, though the latter character is rather inconspicuous, viz. : the second series of hyaline spots between radialsector and cubitus is larger and apicalwards from it is a third smaller series, whereas traces of minute hyaline spots are in the apical part of both wings. The colour of the body is red, but can vary to black, as the black colour of the sides of head and thorax increases in different degrees and can at last wholly occupy these parts as in *fenestralis*, but I saw many mature specimens, that had conserved the red colour on head and prothorax as more or less large spots.

The gonopoda of the ♂ are very similar to those of the foregoing species, but the tips of the appendices superiores are more curved to one another and more thickened, they miss however the incurvation at the tips. The penis is obtusely furcated at the apex, the branches are longer and more acute than in *Mac Lachlani* to which it has a strong resemblance.

The measures are the same. I only examined Mac Lachlan's type, a very immature ♂ that has been preserved before in alcohol, the colours of the wings being very indistinct. The fatherland is indicated as India orientalis.

Neoneuromus latratus tonkinensis (Weele).

Neuromus latratus subsp. *tonkinensis* Weele, Notes Leyden Mus., XXVIII, p. 239, figs. 11, 12; plate 3, fig. 2 ♂ (1907).

This species, which agrees with *latratus* in pattern of the wings and colours of the body, is only to be distinguished from it by the gonopoda of the ♂.

The appendices superiores have a narrow parallel impression at the innerside of the apex and a linguiform one at the underside of it. The apex of the penis remembers in form much that of *fenestralis,* but it is without the longitudinal impressions of this species.

Habitat : Tonkin.

I examined a large series of specimens in all degrees of maturity, all from Tonkin, Mauson Mountains, 2-3000 feet, April-May, and from Central Tonkin, Chiem Hoa, August-September, collected by H. Fruhstorfer. According to the dates there seem to be two generations in the year. Mr. Fruhstorfer informed me, that the insect, hidden during day-time in shrubs, easily is driven up and then flies slowly like a moth. The types are in the collections of the Leyden- and of the Geneva Museum. One specimen is presented by me to the collection Selys. The figured specimen is an immature female from Tonkin; it is in the Paris Museum.

Genus **NEUROMUS** Rambur (1842).

Rambur, Hist. Nat. Névropt., p. 441 (1842).
Mac Lachlan, Ann. and Mag. Nat. Hist. (4) IV, p. 36 (1869).
Davis, Bull. N. York State Mus. 68, Entom. 18, p. 465 (1903).
Weele, Notes Leyden Mus., XXVI, pp. 208, 209 (1906); Weele, *l. c.*, XXVIII, p. 235 (1907). — Banks, Proc. Ent. Soc. Wash., X, pp. 29, 30 (1908).

Antennae equally shaped in both sexes, moniliform, rather thin and short. Head broad, dorso-ventralwards compressed, about twice as broad as the prothorax, with a more or less developed acute tooth at each side behind the eyes. Prothorax as broad as long, about half as broad as the head.

Gonopoda of the male consisting of a pair of forcipated superior appendices, which are proportionately broad, or broader at the base, but never clubshaped. Appendices inferiores clawshaped. Genitalvalve well developed, covering the penis, which is simple but with distinct traces of its double origin.

Colour of body and wings luteous. Species of mediocral size.

Habitat : India and the Malay Archipelago.

This genus contains the more primitive species of the group of which *Corydalus, Acanthacorydalis* and *Protohermes* are more specialized derivations. It must be restricted to the typical asiatic species *testaceus* Rambur and its nearest ally *intimus* Mac Lachlan.

* **Neuromus testaceus** Rambur.

Neuromus testaceus Rambur, *l. c.*, p. 442, tab. 10, fig. 1 ♂ (1842).
Hermes testaceus Rambur, Walker, Cat. Brit. Mus. Neur., p. 206 (1853).
Neuromus testaceus Rambur, Mac Lachlan, *l. c.*, p. 46 (1869). — Weele, *l. c.*, XXVI, p. 210, textfigs. 1, 2, tab. 16, fig. 1 ♀ (1906); Weele, *l. c.*, XXVIII, p. 141 (1906); Weele, *l. c.*, XXVIII, p. 235 (1907). — Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908).

This species is the type of the genus to which the name *Neuromus* must be restricted. It inhabits the Malay Archipelago and is known from Java (type-specimen), Sumatra, Borneo and Labuan, and from Amboyna (this latter locality seems to be doubtful). It does not form subspecies on the various islands. I found a large variation in colour and size in the large series of individuals that I examined, but none of these differences was restricted to a special island.

As my earlier figures of the gonopoda were drawn after a dried specimen, I judged it necessary to give a new scheme of these important organs after a carefully made chitine-preparation (fig. 18).

The penis (fig. 19), which in dried specimens is covered by the genitalvalve, shows a very complicated structure, and the form of the superior and inferior appendices and of the genital-

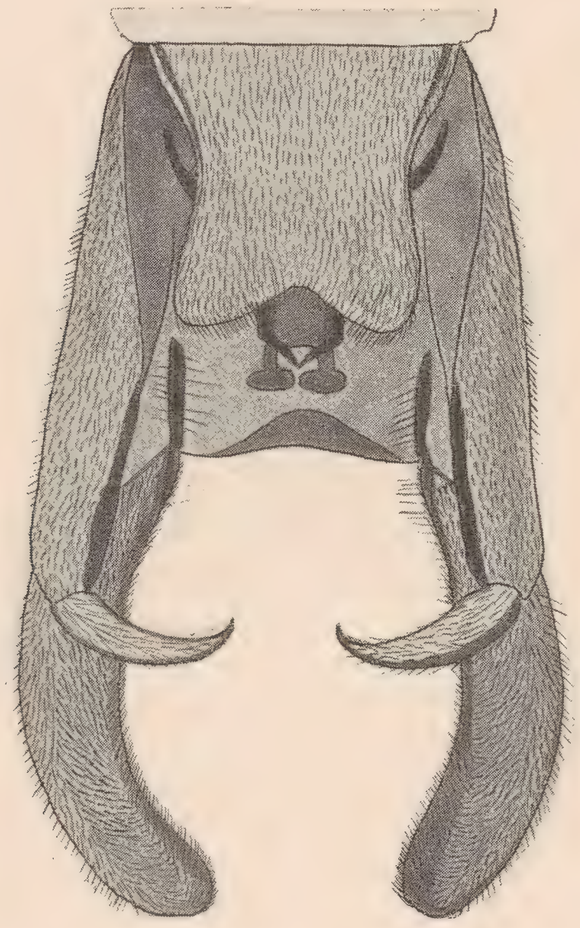

FIG. 18. — *Neuromus testaceus* Rambur ♂.
Gonopoda, underside.
(Coll. Selys).

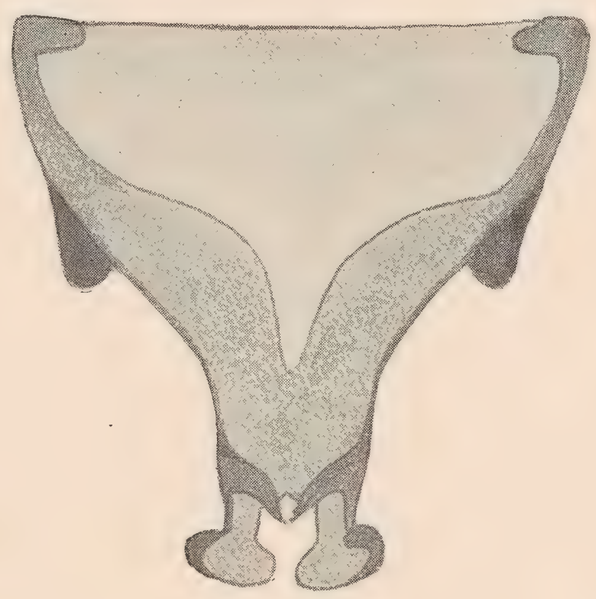

FIG. 19. — *Neuromus testaceus* Rambur ♂.
Penis, underside.
(Coll. Selys).

valve makes its distinctness from the nearly related and very similar *intimus* MAC LACHLAN from India very clear.

The measures are the following :

Body : ♂ 27-33^{mm}, ♀ 34-40^{mm}; forewing : ♂ 32-40^{mm}, ♀ 40-50^{mm}; hindwing : ♂ 29-35^{mm}, ♀ 38-45^{mm}; abd. : ♂ 13-17^{mm}, ♀ 20-24^{mm}; gr. br. : ♂ 11-12^{mm}, ♀ 12-14^{mm}; gr. br. : ♂ 11-12^{mm}, ♀ 12-14^{mm}; app. : ♂ 2 $^{1}/_{2}$-3^{mm}.

Habitat : Java, Borneo, Labuan, Sumatra.

RAMBUR's type is in the collection SELYS. It is a small male, without label of origin, but after RAMBUR's description it is from Java (collection SERVILLE). It bears a label « *Neuromus testaceus* RAMBUR » written by RAMBUR and another written by Dr. HAGEN. There is a ♀ from « Java oriental, Mount Ardjoeno, VAN LANSBERGE » and another male, as large as the type, from Amboyna, collected by SUIJCKERBUIJCK. This specimen does not differ from those of the other Soenda-Islands and it is the first of the family that I saw from the eastern parts of Insulinde. As there exists such an obvious difference between the fauna of the Moluccas and that of the Soenda-Islands, I mention its occurrence in Amboyna on a single specimen with some doubt, in as much as there are often sold in Amboyna zoological collections, which are not collected there.

Neuromus intimus Mac Lachlan.

Mac Lachlan, Ann. and Mag. Nat. Hist. (4) IV, p. 44 (1869).

Weele, Notes Leyden Mus., XXVIII, p. 236, fig. 7 (1907). — Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908).

This species, very similar to *testaceus* Rambur, is easily distinguished from it by the black tibiae and tarsi.

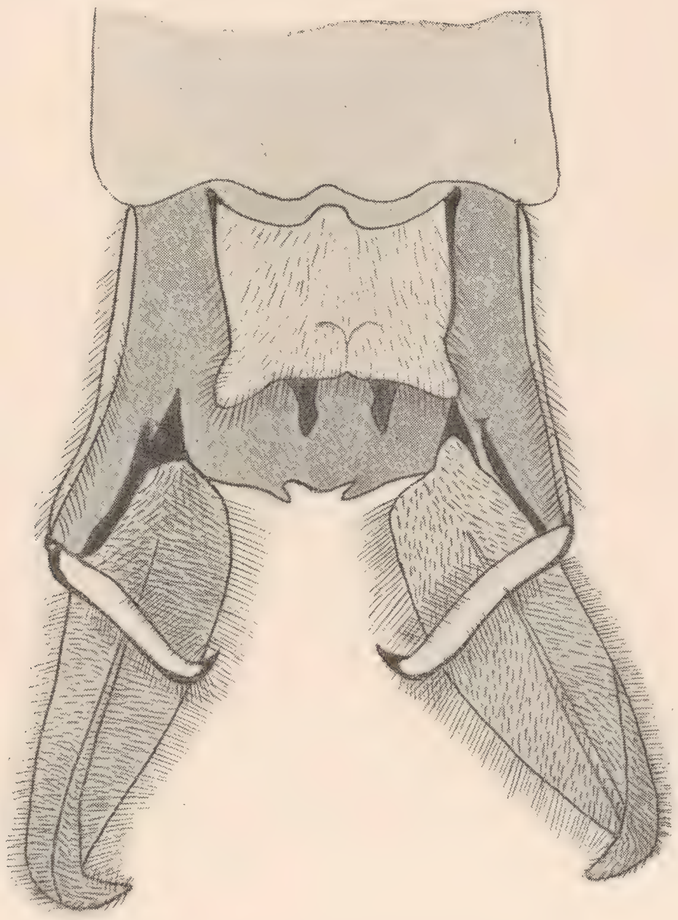

Fig. 20. — *Neuromus intimus* Mac Lachlan ♂. Genitalia, underside. (Coll. Selys).

Fig. 21. — *Neuromus intimus* Mac Lachlan ♂. Penis, underside. (Coll. Selys).

As to its gonopoda (fig. 20) it is much more primitive, especially by the less complicated penis (fig. 21). The genitalvalve is nearly quadrangular, the appendices superiores more pointed towards the apex and the inferior appendices are much more slender.

The measures are the following :

Body : ♂ 25-35^{mm}, ♀ 35^{mm}; forewing : ♂ 37-43^{mm}, ♀ 49^{mm}; hindwing : ♂ 32-39^{mm}, ♀ 45^{mm};
abd. : ♂ 10-15^{mm}, ♀ 20^{mm}; gr. br. : ♂ 12-15^{mm}, ♀ 16^{mm}; gr. br. : ♂ 12-15^{mm}, ♀ 16^{mm};
app. : ♂ 3^{mm}.

Habitat : India.

The type was labelled « East-Indies », but my supposition, that with this indication probably was meant « Hinter-Indien », which supposition was based on the near relation to *testaceus* Rambur, is wrong, as I examined a series of four specimens (3 ♂♂ and 1 ♀) in the collection Selys from India, Sabathu 31 July, Atkinson. In the British Museum I saw the type and a male from India (collection Saunders).

One of the ♂♂ in the collection Selys has the crossveins between radialsector, media and cubiti in the basal half of the forewings very broadly margined with black, so that they are like black spots. The apical border of both wings is smoky, so that it remembers an immature specimen of *latratus* Mac Lachlan.

Genus **CHLORONIA** Banks (1908).

Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908). — Weele, Notes Leyden Mus., XXX, p. 252 (1909).

Though the habitus of the species of this genus is very similar to that of the species of *Neuromus* (s. str.) and their resemblance in colour and form is striking, there are some important characters to bring them into a new genus.

The head is relatively much narrower, about 1 $^1/_2$ broader than the prothorax (in *Neuromus* twice) and much less compressed. The dent on the cheeks is much feebler, not so prominent, and recalls to mind that of *Hermes* and *Protohermes*.

As to the gonopoda it is interesting that there is not a penis as in *Neuromus,* but the distal border of the genitalporus forms a wall, from which can arise two separated corneous setae. It mostly remembers *Platyneuromus* and *Corydalus*. The appendices inferiores are not clawlike, but clubshaped, with a very small, chitinous claw at the tip like in *Acanthacorydalis*. The females have a semicircular small bag at the hindborder of the 5th sternit.

Habitat : Middle- and tropical America.

Rambur described one species but placed it as second species in his genus *Neuromus*. Banks indicates as the type *Hermes corripiens* Walker, which has the most primitive characters. The genus remembers *Acanthacorydalis* and *Corydalus* in the formation of the gonopoda, and is probably the praecurrent of the last.

Chloronia hieroglyphica (Rambur) (Planche I, fig. 6).

Neuromus hieroglyphicus Rambur, Hist. Nat. Névropt., p. 442 (1842).

Hermes hieroglyphicus Rambur, Walker, Cat. Brit. Mus. Neur., p. 206 (1853).

Corydalis hieroglyphicus Rambur, Hagen, Neur. N. Amer., p. 194 (1861).

Neuromus hieroglyphicus Rambur, Mac Lachlan, Ann. and Mag. Nat. Hist. (4) IV, p. 45 (1869). — Davis, Bull. N. York Stat. Mus. 68, Ent. 18, p. 469 (1903). — Banks, Proc. Ent. Soc. Wash., p. 30 (1908).

Antennae wholly yellow; tips of mandibles, a spot between the ocelli, two linear points on the occiput, a couple of points in the fore-half of the prothorax and a second pair in the end of the prothorax, black. A couple of black points in the middle of the frontborder of the mesothorax and a second one near the base of the forewings. Legs yellow, the claws brown. Abdomen yellow.

Wings short and broad, very obtuse, about three times so broad as long. Crossveins dark brown or blackish in the forewings, yellowish in the hindwings. In both ends of the forewings the cells have an indistinct dark point, which points are often connected so as to form a dark streak. In the cells of the hindborder these streaks are very distinct. Hindwings without markings. The genitalia of the ♂ (fig. 22) are remarkable for the conical analporus; the appen-

dices superiores are acute, with the apex strongly bent inwards; the appendices inferiores are rather slender, moderately curved, with a clawshaped tip. The genitalvalve is nearly round with a very broad, shallow excision at the hindborder. The penis, which has been indicated

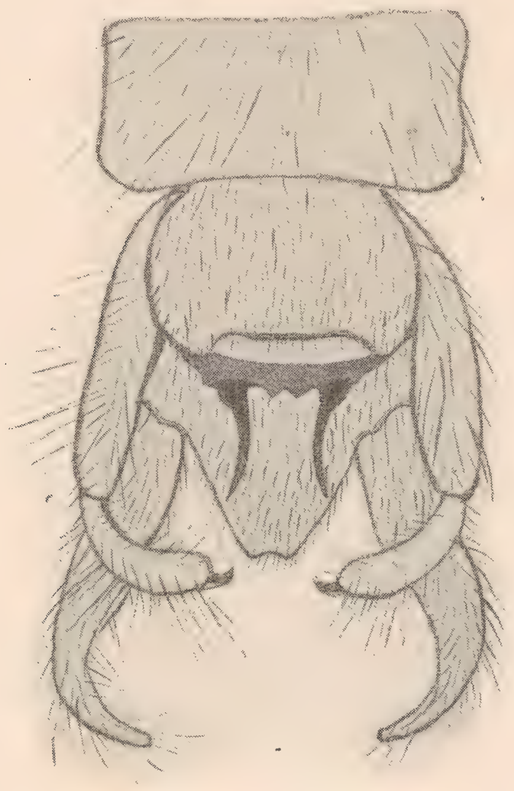

FIG. 22. — *Chloronia hieroglyphica* (Rambur) ♂.
Gonopoda, underside.
(Coll. Selys).

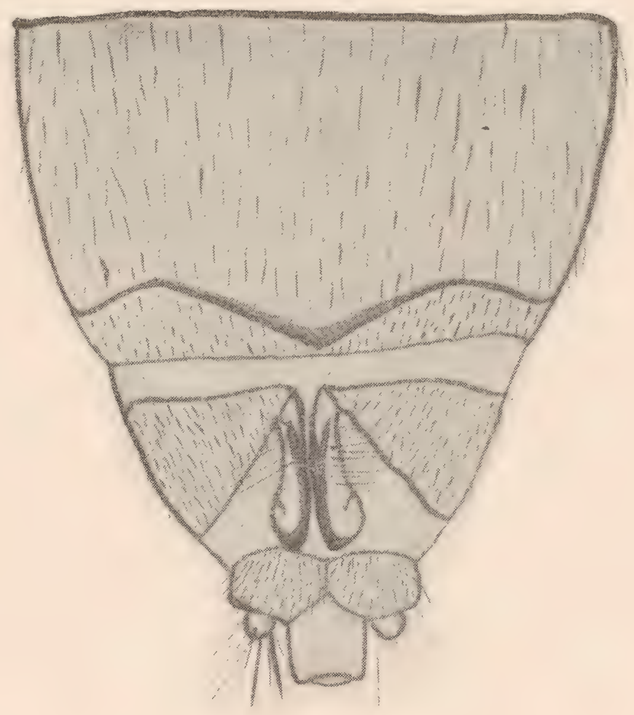

FIG. 23. — *Chloronia hieroglyphica* (Rambur) ♀.
Gonopoda, underside.
(Coll. Selys).

in the figure a little more forewards than it is situated in its natural position, is a slightly chitinized hindborder of the genitalporus, with two outwardly curved, hornshaped, long, acute processes, which are visible in the dried specimen from below the genitalvalve.

The female genitalia (fig. 23) are remarkable for the obtusely angulated hindborder of the last sternit and the broad and obtusely angulated analvalves.

Body : ♂ 24mm, ♀ 28mm; forewings : ♂ 24mm, ♀ 30mm; hindwings : ♂ 22mm, ♀ 27mm;
abd. : ♂ 10mm, ♀ 13mm; gr. br. : ♂ 9mm, ♀ 10mm; gr. br. : ♂ 9mm, ♀ 10mm;
app. : ♂ 2mm.

Habitat : French Guyana and Venezuela.

I examined RAMBUR's type, a male from Cayenne (collection SERVILLE), and a female from Venezuela, both in SELYS collection.

* **Chloronia corripiens** (Walker) (Planche I, fig. 5).

Hermes corripiens WALKER, Trans. Ent. Soc. Lond. (2) V, p. 180 (1860).
Neuromus corripiens WALKER, MAC LACHLAN, Ann. and Mag. Nat. Hist. (4) IV, p. 45 (1869).
— DAVIS, Bull. New York State Mus. 68, Ent. 18, p. 469 (1903).
Chloronia corripiens BANKS, Proc. Ent. Soc. Wash., X, p. 30 (1908).

This species is easily distinguished from the above mentioned by the black antennae, the bases of which are luteous. Its size is larger. The black spots on the occiput are absent, as well as those of the mesothorax. The prothorax has only streaklike indications of the dark spots. Legs yellow, only the claws and the annulations of the tarsi dark.

Wings much longer and narrower, with the apex more acute and the costal-area a little broader in the middle. Membrane whitish hyaline, with yellow nervature in the forewings. Most of the crossveins are dark and often also the ends of the costalveins. The dark markings in the cells are absent, only those of the cells of the hindborder can be indicated in darker coloured specimens.

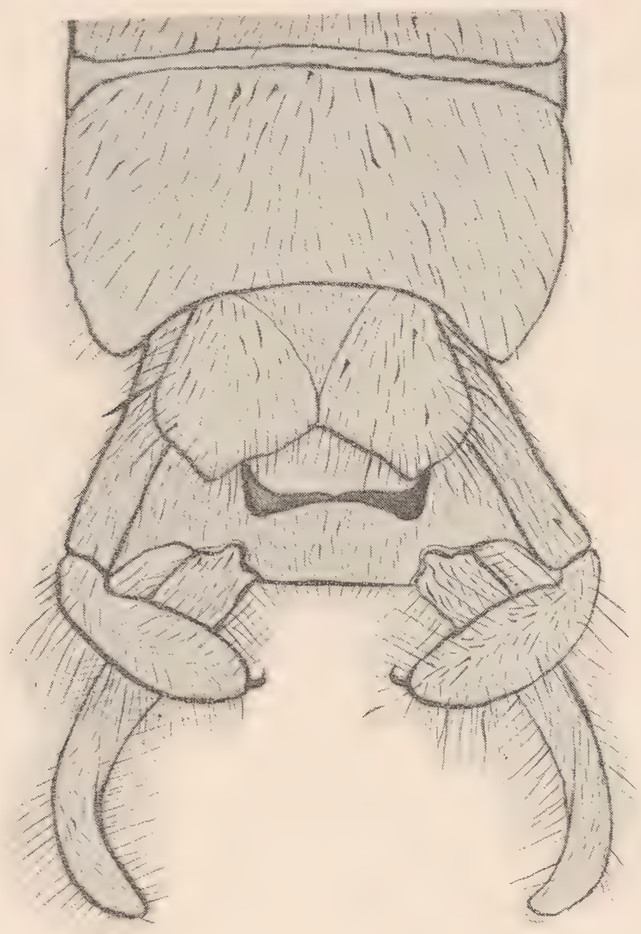

FIG. 24. — *Chloronia corripiens* (Walker) ♂.
Gonopoda, underside.
(Coll. Selys).

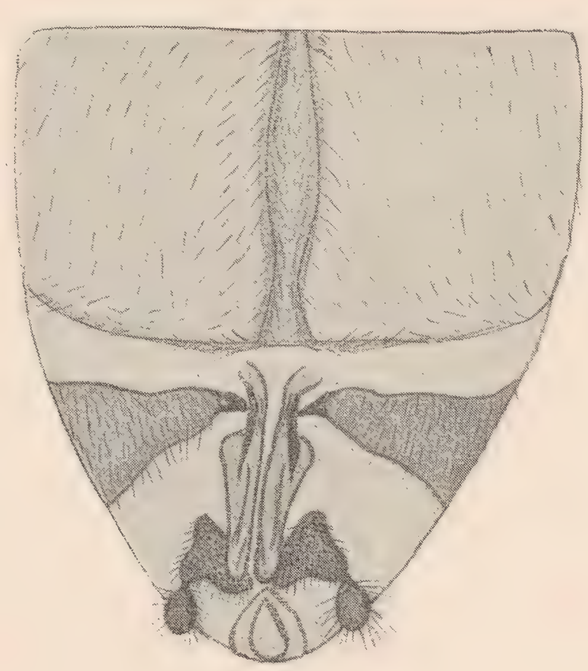

FIG. 25. — *Chloronia corripiens* (Walker) ♀.
Gonopoda, underside.
(Coll. Selys).

Genitalia yellowish. The male (fig. 24) differs from *hieroglyphica* by the more obtuse and less strongly curved appendices superiores. The appendices inferiores are more straight and thicker, with the clawlike tip much more curved. The genitalvalve is distinctly divided and its hindborder consists of two obtusely angulated lobes. The penis is very short and forms only a chitinized hindborder of the genitalporus with two obtuse lobes, indications of the long and slender horns of *hieroglyphica*.

The female (fig. 25) also shows more primitive characters, the hindborder of the last sternit being straight, with a broad stripelike, low gutterlike cosina in the middle. The anal valves are also different.

Body : ♂ 33^{mm}, ♀ 33-40^{mm}; forewing : ♂ 35-37^{mm}, ♀ 40-47^{mm}; hindwing : ♂ 32-34^{mm}, ♀ 37-44^{mm}; abd. : ♂ 28^{mm}, ♀ 15-22^{mm}; gr. br. : ♂ 12^{mm}, ♀ 13-16^{mm}; gr. br. : ♂ 12^{mm}, ♀ 13-16^{mm}; app. : ♂ 3^{mm}.

Habitat : Brazil, Parana, Espirito Santo, Theresopolis.

I examined WALKER's type, a specimen from SAUNDERS collection in the British Museum, and a large series of specimens from various collections.

In SELYS collection is a series of four ♀♀, with the general indication « Brésil or Perou » and Brésil.

The species seems to be very common, as it is represented in nearly all collections.

According to DAVIS, HAGEN's *Corydalis livida* nom. nud. Syn. Neur. N. Amer., p. 321 (1861), is this species. I also possess a ♂ from Brazil, named as *Chauliodes elegans* PERTY.

[**Chloronia meridionalis** Weele] (Planche I, fig. 7).

Chloronia meridionalis Weele, Notes Leyden Mus., XXX, p. 252 (1909).

Of the same size and in most of the characters nearly related to *corripiens* Walker.

Antennae black, the basal fourth yellow. Body yellow, tips of mandibles and the spot between the ocelli, black. Pronotum with two short, longitudinal black lines in the anterior half and two similar lines in the posterior half, which latter are farther removed from one another than the anterior ones.

Legs yellow, knees dark brown. Abdomen yellow.

Wings pale yellowish grey. Nervature brown, the crossveins black. The forewings with fuscous streaks or points along the hindborder to the tip as in *corripiens*, and ditto in the cells between the branches of the radialsector. In the hindwings only three small fuscous points between media and radialsector visible in the first cell.

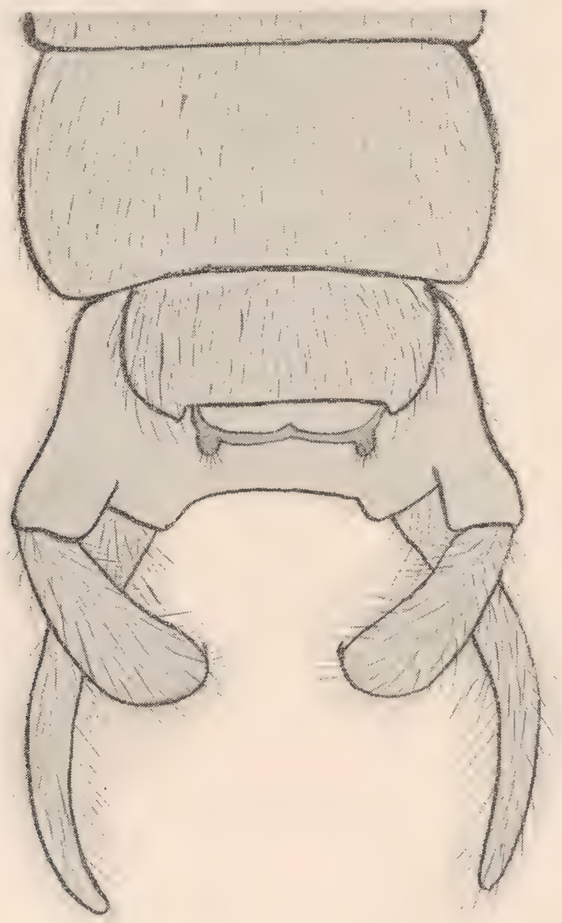

Fig. 26. — *Chloronia meridionalis* Weele ♂.
Gonopoda, underside.
(Leyden Museum).

The genitalia of the ♂ (fig. 26) are similar to those of *corripiens;* the appendices inferiores are very different and the genitalvalve is more like that of *hieroglyphica*. The penis much remembers that of *corripiens*, but it has two small tubercles as in *bogotana* though much smaller.

Body : 25mm; forewing : 33mm; hindwing : 30mm; ant. 11mm;
abd. : 10mm; gr. br. : 12mm; gr. br. : 11 1/2mm.

Habitat : Southern Brazil, Minas Geraës.

One male from Minas Geraës, 14 November 1900, Kennedy, purchased from the London Naturalist W. F. H. Rosenberg, in the Leyden Museum (coll. van der Weele). Probably this form is the male of *N. Winthemi* Davis.

[**Chloronia bogotana** Weele] (Planche II, fig. 10).

Chloronia bogotana Weele, Notes Leyden Mus., XXX, p. 253 (1909).

Related to and of the same size as *corripiens* Walker, but in coloration of the wings and in form of the penis much resembling *hieroglyphica* Rambur.

Antennae yellow. Head reddish yellow, tips of mandibles and two longitudinal lines on the occiput, black. Prothorax with traces of dark spots in the anterior and posterior angles. Meso- and metathorax and abdomen of the same colour. Legs luteous brown, the last tarsal joint shining black above; the knees of the anterior legs dark brown, those of the other legs paler.

Wings in form intermediate between the above quoted species, membrane yellow, nervature yellow, the crossveins nearly all black, only in the posterior wings paler. In the forewings all the crossveins of the disk broadly margined with a pale bluish grey colour, that often occurs as spots in the cells. The costalveins

FIG. 27. — *Chloronia bogotana* Weele ♂.
Gonopoda, underside.
(Leyden Museum).

FIG. 28. — *Chloronia bogotana* Weele ♂.
Genitalvalve.
(Leyden Museum).

and those at the origin of the media and distalwards from the cubiti are deep black. The hindwings have paler crossveins and the dark spots are absent. The genitalia of the ♂ (fig. 27) remember in their elongate clubshaped appendices inferiores and in the curved appendices superiores those of *corripiens*. The genitalvalve (fig. 28) is also similar, but the penis is more like that of *hieroglyphica*, as it consists of two digitiform hairy prominencies.

Body : ♂ 30mm; forewing : 36mm; hindwing : 32mm; ant. : 11mm;
abd. : ♂ 15mm; gr. br. : 13mm; gr. br. : 11mm;
app. sup. : 3mm.

Habitat : Columbia, Bogota.

One male from Bogota, Columbia, purchased from the London Naturalist DONCASTER. The type is in the Leyden Museum (coll. VAN DER WEELE). The female is unknown.

[**Chloronia Winthemi** (Davis)] (Planche II, fig. 14).

Neuromus Winthemi DAVIS, Bull. New York State Mus. 68, Ent. 18, p. 470 (1903).

This form may be the immature female of *Chloronia bogotana,* having the last tarsal joint black; in all other species it is yellow. The other characters given in the description are of very problematic value and, though I compared a photograph of the type, I cannot give other characters of this form. Probably it is related to *meridionalis,* even it may be the same, as WINTHEM's insects were chiefly collected in Southern Brazil, Bahia, which is probably also inhabited by *meridionalis*.

I give here the principal characters of DAVIS' description : Yellowish; mandibles reddish brown; head brownish yellow, lighter on hind part; sides of head one-toothed; prothorax longer than broad, dark marking(s) indistinct; legs light yellow, last tarsal segment blackish; wings whitish hyaline; veins yellow; fore pair with the crossveins and angles of veins more or less brown. Antennae broken off.

Body : 32mm; alar expanse : 90mm.

The type is in the Museum of Comparative Zoology (collection HAGEN).

Genus **PROTOHERMES** Weele (1907).

Weele, Notes Leyden Mus., XXVIII, p. 243 (1907).
Banks, Proc. Ent. Soc. Wash., X, pp. 28, 29 (1908).

This genus is erected in behalf of the species intermediate between *Neuromus* and *Hermes*. The pattern of the wings remembers that of *Hermes,* though it is often very inconspicuous and then calls to mind the *Neuromus*-species. The head is shaped as in *Pseudoneuromus,* but the dents of the cheeks are not developed, only indicated by an obtuse angle.

The antennae are filiform in both sexes, the prothorax is somewhat longer than broad and about two thirds of the breadth of the head. On the middle of the occiput are the same linguiform markings as in *Hermes, Chauliodes* and *Sialis*. In *Neuromus* etc. they are dendriform at the sides.

The wings are of the same shape as in *Neuromus;* they have similar pattern and the typical round yellow spots in the apical part as in *Hermes*.

The gonopoda of the male are remarkable, because the appendices superiores are much feebler, they may be very long and setiform, or short and curved inwards, so that they are hidden in the last tergit, or they have the form of a bifurcated forceps. The appendices inferiores are feebler, the hindborder of the last tergit does not form a processus at their base, their tips are strongly curved but do not reach nor cross one another. The genitalvalve is strongly developed and forms the most conspicuous part of them. It consists of two separated valves, which are acutely triangular, or they are united at the base and the tips proceed under the other appendices. The penis is short and only visible in chitine-preparations.

Habitat of the genus : India, China, Japan, Insulinde.

Type is *P. anticus* (Walker).

Protohermes dichrous (Brauer).

Neuromus dichrous Brauer, Sitzungsber. Akad. Wien, t. 77, p. 205 (1878).

Hermes dichrous Brauer, Weele, Notes Leyden Mus., XXVI, p. 213, taf. 16, fig. 2 ♀ (1906).
— Id., *l. c.*, XXVIII, p. 141, textfig. (1906). — Id., *l. c.*, p. 247 (1907).

This is the smallest and most primitive species of the genus, as the appendices superiores of the ♂ are long and setiform, in dried specimens mostly folded. The appendices inferiores are nearly straight, with the tips somewhat curved; they remember in form those of *N. intimus* Mac Lachlan. The genitalvalve consists of two separated acutely triangular valves. The penis was not visible in the specimens I examined.

Body luteous; a black spot between the ocelli, two spots on the occiput and four on the prothorax, which latter can be connected to a longitudinal streak at each side. Two black spots of the same shape on the mesothorax.

Wings oval, the anterior pair with a smoky membrane in which the veins are blackish, except those in the yellow spots which are yellowish. The yellow markings are larger and

almost connected in the ♂, more isolated in the ♀; they vary after the degree of maturity. In the hindwings nearly two thirds of the basal half is yellowish, only the apical third is greyish, except the round apical spot, which is mostly somewhat larger than in the forewings.

Body : ♂ 23mm, ♀ 28mm; forewing : ♂ 32mm, ♀ 42mm; hindwing : ♂ 29mm, ♀ 38mm;
abd. : ♂ 10mm, ♀ 14mm; gr. br. : ♂ 11mm, ♀ 15mm; gr. br. : ♂ 11mm, ♀ 16mm;
app. : ♂ 5mm.

Habitat : Borneo, Labuan, Java.

Brauer's types, two ♂♂ in different degree of maturity, have not been found. Judging from the description, there remains however no doubt, that the specimens I examined, belong to this species.

In the collection Selys is a large female from Borneo, Mount Mulu, 1894.

* **Protohermes anticus** (Walker) (Planche II, fig. 11).

Hermes anticus Walker, Cat. Brit. Mus. Neur., p. 205, n°. 8, ♀ (1853). — Mac Lachlan, Journ. Linn. Soc., IX, p. 260 (1869).

Hermes costalis Walker, *l. c.*, p. 207, n°. 14, ♂ (1853). — Mac Lachlan, *l. c.* (1869).

Neuromus grandis Mac Lachlan nec Thunberg, Ann. and Mag. Nat. Hist. (4), IV, p. 45 (1869).

Neuromus infectus Mac Lachlan, *l. c.*, p. 41 (1869).

Protohermes anticus Walker, Weele, Notes Leyden Mus., XXVIII, p. 244, fig. 15 (1907). — Banks, Proc. Ent. Soc. Wash., X, p. 29 (1908).

Somewhat larger than *dichrous* and the colour generally darker. The dark spots on the upperside of the body larger and more connected. Nervature relatively paler and the membrane darker greyish brown; the yellow spots in the forewings nearly all isolated, and in the hindwings the yellow base reaches only to the middle. Legs brown in the male, paler in the female.

Gonopoda of the ♂ much more inconspicuous. Appendices superiores very short, slender, cylindrical, nearly straight, directed inwards, the tips crossed. The appendices inferiores somewhat stronger than the appendices superiores, strongly curved. Genitalvalve large, the sides prolonged so as to form long, acute, triangular prominencies.

Body ♂ : 20mm; forewing : 36-45mm; hindwing : 32-40mm;
abd. ♂ : 10mm; gr. br. : 11-12mm; gr. br. : 12-13mm;
app. ♂ : 2mm.

Habitat : India to China.

This species seems to be the continental form of *dichrous,* but it is less primitive, as the appendices superiores are much smaller and the genitalvalves are connected to one bicornous flap.

I examined Walker's type of *anticus,* a mature ♀, and that of *costalis,* a not wholly mature ♂.

Mac Lachlan's *infectus* is a very mature ♂ of this species from Darjeeling, the type is also in the British Museum. Walker's types are paler coloured, but I saw darkly coloured specimens from Sikkim and China, so that there is no reason to separate them as subspecies by the colour of wings.

In the collection Selys is a mature male from Darjeeling, Atkinson. In the Paris Museum is a ♂ from Bhootan, Pedong, R. Oberthür, 1897.

Not to be identified is :

[**Protohermes montanus** (Mac Lachlan)] (Planche II, fig. 13).

Neuromus montanus Mac Lachlan, Ann. and Mag. Nat. Hist. (4), IV, p. 42 (1869).

Protohermes montanus Mac Lachlan, Weele, Notes Leyden Mus., XXVIII, p. 247 (1907).

I examined the type-specimen, a badly preserved female that has been before in alcohol, and regarded it as a specimen of the foregoing species, but certainty is only to obtain with better materials from the same locality.

Habitat : Sikkim, Himalaya, 9000 feet.

The type is in the British Museum.

Protohermes grandis (Thunberg) (Planche III, fig. 19).

Hemerobius grandis Thunberg, Nov. Ins. Spec., I, p. 28, fig. 44 (1781).

Neuromus grandis Thunberg, Mac Lachlan, Ann. and Mag. Nat. Hist. (4), IV, p. 45 (1869); Transact. Ent. Soc., 1875, p. 173 (1875). — Weele, Notes Leyden Mus., XXVI, p. 212 (1906). — Id., *l. c.*, XXVIII, p. 243 (1907).

Protohermes grandis Banks, Proc. Ent. Soc. Wash., X, p. 29 (1908).

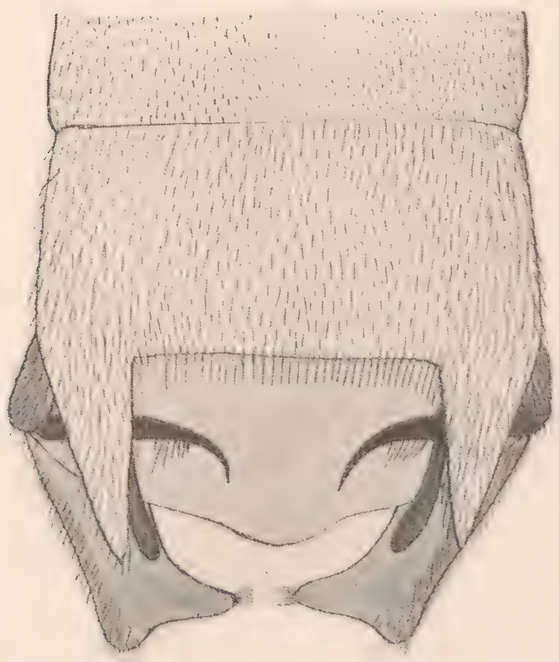

Fig. 29. — *Protohermes grandis* (Thunb.) ♂.
Gonopoda, underside.
(British Museum).

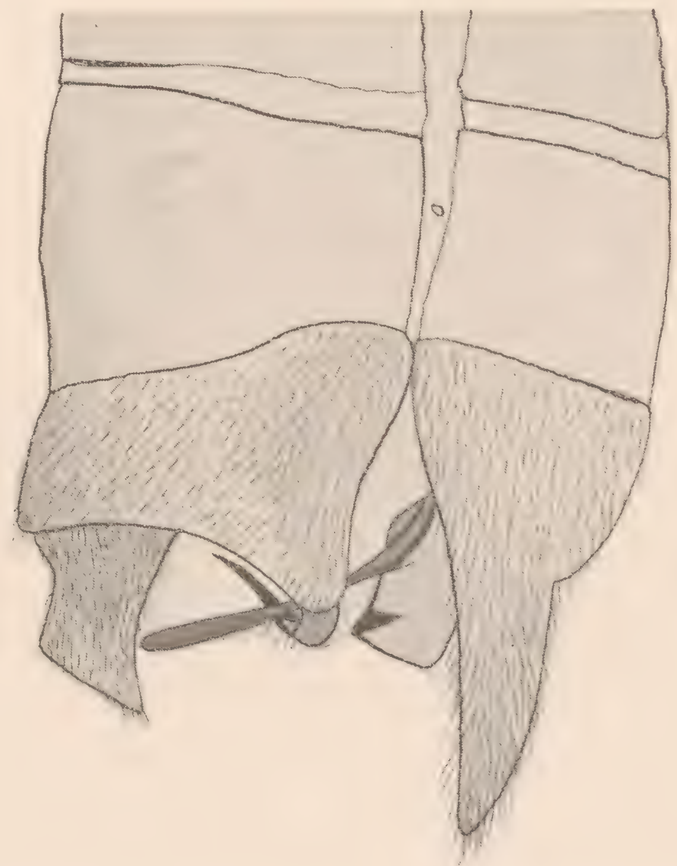

Fig. 30. — *Protohermes grandis* (Thunb.) ♂.
Gonopoda, lateral view.
(British Museum).

Very similar to *anticus,* but larger, tips of mandibles black, legs luteous or fuscous.

The black spots on the pronotum are mostly united at each side to a black streak.

The wings have the same form and ground-colour, but the yellow spots are still smaller and in the hindwing the yellow part does not reach the middle.

The gonopoda of the ♂ (figs. 29, 30) are very different. The appendices superiores are still shorter and cruciform, the appendices inferiores are fishangle-shaped, with the tips directed upwards. The genitalvalve has a similar form, but the processi are narrower. The penis consists of a broad basal part from which sides arise two long clubshaped processi, each of which is situated between the appendices inferiores and the lateral border of the last tergit.

Body : ♂ 35^{mm}, ♀ 45^{mm}; forewing : ♂ 44^{mm}, ♀ 55^{mm}; hindwing : ♂ 40^{mm}, ♀ 50^{mm};
abd. : ♂ 17^{mm}, ♀ 25^{mm}; gr. br. : ♂ 14^{mm}, ♀ 17^{mm}; gr. br. : ♂ 15^{mm}, ♀ 18^{mm}.

Habitat : Japan.

THUNBERG's description and figure are very primitive, but the species is sufficiently characterized by them. MAC LACHLAN united in 1869 *anticus* and *costalis* WALKER with it, but in 1875, after an examination of the gonopoda, he is not very sure of the correctness of this union and indicates differences in the gonopoda between *anticus* and *infectus,* which I failed to find.

In the collection SELYS is one female, indicated « Japon, n° 26 », surely the specimen mentioned by MAC LACHLAN (1875). From the Paris Museum I saw two couples labelled : Nippon moyen, environs de Tokio, J. HARMAND 1906; Kofou, L. DROUART DE LEZEG 1906 et Kiou-Siou, bassin supérieur de la Sendaigawa, J. HARMAND 1906.

As I saw but a few specimens of this species, I presume that it is not very common.

[**Protohermes albipennis** (Walker)] (Planche II, fig. 15).

Hermes albipennis WALKER, Cat. Brit. Mus. Neur., p. 206, n° 13 (1853). — MAC LACHLAN, Journ. Linn. Soc. IX, p. 260 (1869).

Neuromus albipennis WALKER, MAC LACHLAN, Ann. and Mag. Nat. Hist. (4), IV, p. 46 (1869).

Protohermes albipennis WALKER, WEELE, Notes Leyden Mus., XXVIII, p. 245, figs. 16, 17 (1907). — BANKS, Proc. Ent. Soc. Wash., X, p. 29 (1908).

Hermes maculatus WALKER, Trans. Ent. Soc. London, (2), V, p. 180 (1860).

Neuromus maculatus WALKER, MAC LACHLAN, *l. c.*, p. 45 (1869).

Of the same size as *anticus* WALKER and resembling it very much. It is distinct from it by the following characters :

Occiput with only two black spots as in *dichrous*. Prothorax very broad, nearly as broad as the broad head, with broad, black, lateral lines, which are more or less divided into two spots. Mesothorax with two round black spots. Legs yellow, annulations of the tarsi and tibiae narrowly black; in some specimens the tarsus is very dark and the last joint wholly black.

Wings of the same shape; the costalveins yellow, dark in *anticus;* the veins in the apical part of both wings brown, at least darker than the basal yellow ones. Membrane yellowish hyaline, mostly colourless; in very mature specimens it is somewhat greyish and this colour occupies in the forewings the costal area, traversed by the yellow costalveins, and a system of narrow connected yellow markings, reaching to the middle of the wing, divides it into many, more or less connected, irregular spots. The yellow apical spot is very inconspicuous and small in both wings. In the hindwings the yellow colour occupies two thirds of the basal part of it.

The gonopoda of the male are very anomalous; they remember somewhat those of *Hermes*, the appendices superiores being furcated.

The appendices inferiores are in form like those of the other species, the genitalvalve consists of two large triangular valves. The tuberculum is situated on the lateral base of the appendices superiores.

Body : ♂ 30^{mm}, ♀ 35^{mm}; forewing : 42-50^{mm}; hindwing : 39-46^{mm};
abd. : ♂ 15^{mm}, ♀ 20^{mm}; gr. br. : 13-15^{mm}; gr. br. : 14-16^{mm}.

Habitat : India, Assam, Khasia Hills, Kulu, Nepaul.

I saw a series of 8 specimens in the British- and Leyden Museum (coll. VAN DER WEELE). WALKER's *albipennis* is from Nepaul, his *maculatus* is without indication of origin, but belongs to the same species.

[**Protohermes Davidi** Weele] (Planche II, fig. 16).

Protohermes Davidi WEELE, Notes Leyden Mus., XXX, p. 254 (1909).

Much resembling *albipennis* WALKER from India, but larger, with a much denser wing-nervature and also very distinct by the genitalia of the ♂.

Body luteous. Tips of mandibles and spot between the ocelli, black. Antennae black; the two basal joints luteous, with a brown annulus in the middle. Prothorax with a broad, black streak at each side. Mesothorax with two black spots. Legs luteous to fuscous.

Wings large and broad, with yellow nervature, which becomes brown towards the apex and the borders, but without defined pale spots. In the hindwings the yellow nervature occupies only about the half, in the forewings nearly two thirds of the wing. In the latter the postcosta and cubitus inferior with adjoining nervature, are fuscous. The crossveins are very numerous and the number of costalveins in the forewing can mount to 46, in the hindwing to 39.

The gonopoda of the ♂ (fig. 31) are yellow and very distinct from those of the other species. The

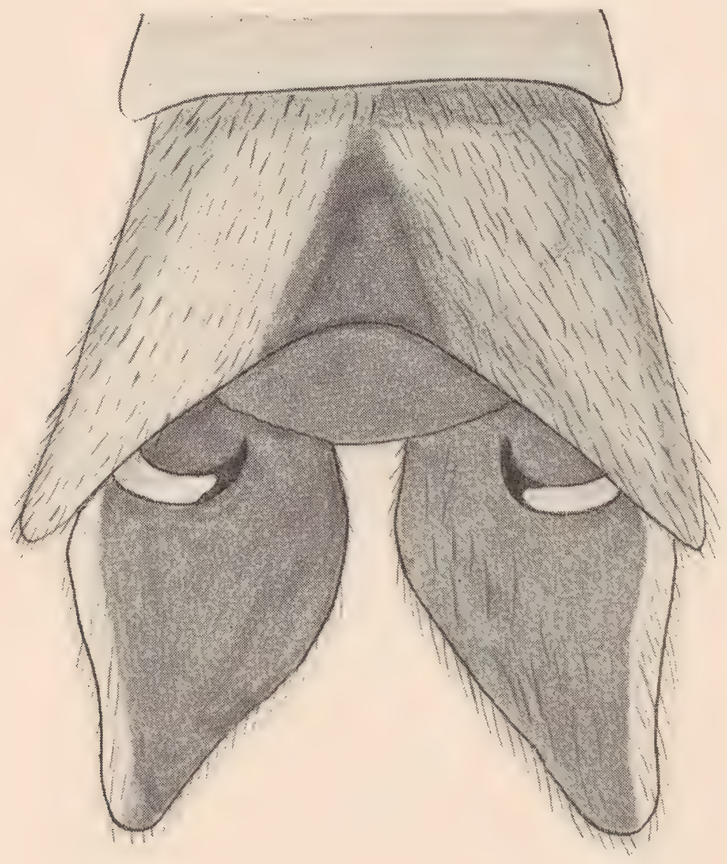

FIG. 31. — *Protohermes Davidi* Weele ♂.
Gonopoda, underside.
(Paris Museum).

appendices superiores are broadly triangular with rounded tips. The genitalvalve consists of two divergent acute triangular prominencies, which are as long as the appendices superiores. The appendices inferiores are short, clawlike, with black tips.

Body : ♂ 30^{mm}; forewing : 48-52^{mm}; hindwing : 42-46^{mm}; ant. : 14^{mm};
abd. : ♂ 15^{mm}; gr. br. : 16-18^{mm}; gr. br. : 16-18^{mm};
app. sup. : ♂ 3^{mm}.

Habitat : China.

Two males, collected in Mou-Pin by the Reverend Father A. DAVID, 1870. I dedicate this species to this well-known french naturalist. The types are in the Museums of Paris and of Leyden.

[**Protohermes Fruhstorferi** (Weele)] (Planche III, fig. 17).

Hermes Fruhstorferi Weele, Notes Leyden Mus., XXVIII, p. 250 (1907).

This species belongs certainly, though it is only known in the female sex, to *Protohermes,* as it has the relatively long and equally broad wings of that genus. The occiput has the same quadrangular form.

The colour of the body, legs, etc. is deep black as in *Hermes,* and that of the wings is also blackish brown with irregular white spots in the basal half and large, round, white, apical spots. Nervature blackish brown, yellow in the white markings; the costalveins too are yellow and broadly margined with yellow in both wings.

Body : 53^{mm}; forewing : 51^{mm}; hindwing : 45^{mm};
abd. : 30^{mm}; gr. br. : 17^{mm}; gr. br. : 17^{mm}.

Habitat : Tonkin.

One female from Tonkin, Thau (May, June-July) collected by H. Fruhstorfer and named after this naturalist. It is the only specimen I examined and I compared it, misled by the resemblance in dark colour of body and wings and yellow costalveins, with *H. costatostriata*, with which species it is however not congeneric.

The type is in the Leyden Museum.

Genus **HERMES** Gray (1832).

Gray in Cuvier's Animal Kingdom, Ed. Griffith, II, p. 331 (1832).

Walker, Cat. Brit. Mus. Neur., p. 201 (1853). — Weele, Notes Leyden Mus., XXVI, pp. 208, 212 (1906). — Banks, Proc. Ent. Soc. Wash., X, pp. 28, 29 (1908).

The characters indicated for *Protohermes* are much more distinct in *Hermes*. The size is generally smaller, and so they call to mind the species of *Chauliodes*. The form of the wings is, in comparison with *Protohermes,* shorter, broader at the base and more pointed towards the apex. The ground-colour of the wings is blackish brown, in immature specimens but little paler. Their pattern is that of *Protohermes,* but the yellow markings are relatively much smaller. The round spot in the apical half is very distinct.

The body is black, the pronotum only is orange, in some species with black spots or wholly black. The head has about the same form as in *Protohermes,* but the angles of the occiput are often more rounded or have nearly disappeared. On the occiput the typical linguiform markings, as in *Protohermes, Chauliodes* and *Sialis,* are present.

The gonopoda of the male are remarkable by the short appendices superiores, which are furcated, the branches forming an obtuse angle and the lower one being longer.

The habitat of the genus is India to Tonkin and the larger Soenda-Islands : Sumatra, Java and Borneo.

The genus was, though briefly, characterized by Gray in behalf of *H. maculipennis* from Java, which, consequently, is its type. Walker ranged in it a number of discordant forms and Mac Lachlan (1869) placed the type-species in *Chauliodes*, reducing *Hermes* to a synonym of the latter genus, but in a note he remarked that *maculipennis* is a very aberrant species and that *Hermes* could be re-established for it, together with *grandis* Thunberg and *infectus* Mac Lachlan. I reconstructed the genus *Hermes* in 1906, placing also in it *Neuromus grandis* Thunberg and *dichrous* Brauer, but in 1907 I erected the genus *Protohermes,* in which the two latter species have been ranged by me.

* **Hermes maculipennis** Gray.

Hermes maculipennis Gray, *loc. cit.*, p. 331, pl. 72, fig. 1 ♂ (1832).

Neuromus ruficollis Rambur, Hist. Nat. Névropt., p. 443 (1842).

Hermes ruficollis Rambur, Walker, Cat. Brit. Mus. Neur., p. 202, n° 2 (1853). — Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 259 (1869).

Chauliodes maculipennis Mac Lachlan, Ann. and Mag. Nat. Hist. (4), IV, p. 39 (part.) (1869).

Hermes maculipennis Weele, Notes Leyden Mus., XXVI, p. 215, textfig. 3, taf. 16, fig. 3 ♀ (1906); Id., *loc. cit.*, XXVIII, p. 142 (1906); Id., *loc. cit.*, p. 248 (1907).

? = *Neuromus maculipennis* Davis, Bull. New York State Mus. 68, Ent. 18, p. 648 (1903).

Body black, pronotum orange without dark spots.

Wings blackish brown, with many small cream-white spots. In the forewings some spots at the base of the hindborder, forming a pale patch which can be connected with other spots, so that it gets a larger extension, but never it touches the frontborder of the wing. In the hindwings the basal spot is larger; it occupies about one fifth of the wing and extends between front- and hindborder. Apicalwards from it there are some other small, round spots; in the hindwings some of these can be connected with the basal spot, in females more frequently than in males. Apical spot very small, about 1-2^{mm} in diameter.

In the gonopoda (fig. 32) the male shows the following characters : appendices superiores bifurcated, lower branch longer; appendices inferiores consisting of a curved, thick basal joint and an upwardly directed setiform one; when seen from behind their tips are crossing one another. The tuberculum is very distinct. The genitalvalve is curiously shaped as a corneous, long, slightly curved prominency with obtuse tip. It shows no indications of suture nor other traces of its pairy nature. The penis (fig. 33) consists of two isolated, black, fingershaped

Fig. 32. — *Hermes maculipennis* Gray ♂.
Gonopoda, lateral view.
(Coll. Selys.)

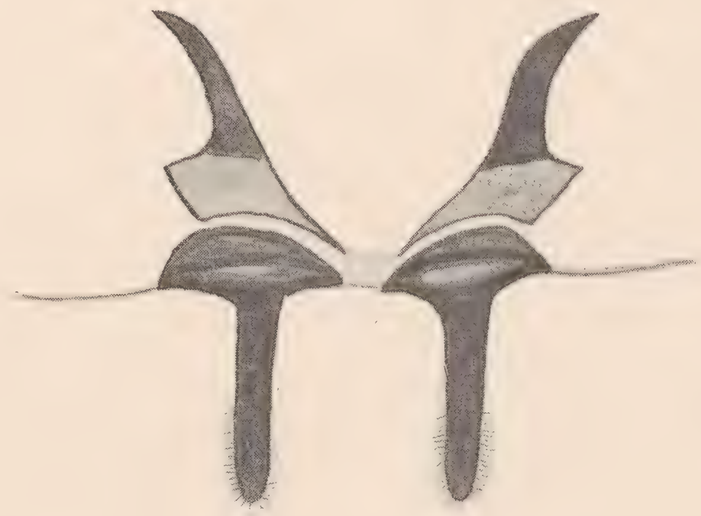

Fig. 33. — *Hermes maculipennis* Gray ♂.
Penis.
(Coll. Selys.)

processes, which are hairy at the tip and articulated dorsalwards with a clawlike chitine-peace laying in the soft membrane between the appendices superiores and inferiores.
Body : ♂ 17-23mm, ♀ 29-35mm; forewing : ♂ 25-32mm, ♀ 38-44mm; hindwing : ♂ 23 1/2-29mm, ♀ 33-39mm; abd. : ♂ 6-10mm, ♀ 12-20mm; gr. br. : ♂ 9-10mm, ♀ 12-14mm; gr. br. : ♂ 9 1/2-10 1/2mm, ♀ 12 1/2-15mm; app. 1 1/2mm.

Habitat : Java and Borneo?

I examined a large series from various localities on Java, from which island the type-specimens are described, and one male from Borneo, Kina Balu, not differing from javenese specimens. The Bornean specimen was bought from Dr. O. STAUDINGER and is in my collection, now in the Leyden Museum. I have however some doubts as to the correctness of this locality.

In the collection SELYS are 3 ♂♂ and 1 ♀ from Batavia, ex coll. LATREILLE; one of them is RAMBUR's type, though there is no label of that author, only one in Dr. HAGEN's handwriting. The specimen agrees in all points with RAMBUR's description.

GRAY's type, a ♂ from Java, after which his figure has been drawn, is in the British Museum.

[**Hermes sumatrensis** Weele] (Planche III, fig. 18).

Hermes sumatrensis WEELE, Notes Leyden Mus., XXX, p. 255 (1909).

Nearly related with *maculipennis* and probably only a subspecies of it, but differing in the apical spots which are about twice larger than in the foregoing species and about one half of those of *maculifera*. The cream-white spots in the forewings are all isolated, more numerous and somewhat larger than in *maculipennis*. There is no basal cream-white spot at the hindborder of the forewings, but two round isolated spots represent the reminiscences of it. In the hindwings it is much larger, about as large as in *maculifera*, and it reaches the anal angle, so that it is about one and a half larger than in *maculipennis*. In the middle it has a long apical prominency and it occupies about the basal half of the wing.

As I have not seen a ♂ of this form, it may be that there are no differences in the gonopoda and that it will prove to be a subspecies of *maculipennis* or *maculifera*, which forms seem to be connected by it.

Body : ♀ 25mm; forewing : 34mm; hindwing : 30mm;
abd. : ♀ 12mm; gr. br. : 12mm; gr. br. : 12mm.

Habitat : Sumatra.

I examined a female (the type) from Pajakombo, Sumatra, collected by the late french naturalist HENRI ROUYER, which type is in the Leyden Museum. Probably the female from Deli, Sumatra, GURBAUR, in the Verona Museum (vide N. L. M., XXVI, p. 218) also belongs to this form. In the Genoa Museum is a female from Balighe, October 1890-February 1891, collected by E. MODIGLIANI.

[**Hermes maculifera** Walker] (Planche III, fig. 21).

Hermes maculifera WALKER, Cat. Brit. Mus. Neur., p. 203, n° 3 (1853). — MAC LACHLAN, Journ. Linn. Soc. Zool., IX, p. 260 (1869); ID., Ann. and Mag. Nat. Hist. (4), IV, p. 39 (part.) (1869). — WEELE, Notes Leyden Mus., XXVIII, p. 142 (1906); ID., *loc. cit.*, pp. 248-249 (1907).

The continental form is also constantly differing from the above described and can be distinguished at a glance by the very large apical spots which are the largest of all isolated spots, and about four times larger than in *maculipennis*. The forewings are spotted as in *sumatrensis*, but all spots are at least twice larger. In the hindwings the basal spot seems to be still larger and it does not show the prominency towards the apex; it surpasses the anal angle and approaches the hindborder much more. The number of the spots is very variable.

The pronotum is orange with traces of three black spots behind the middle. The apex of the wings is more obtuse and more rounded than in *maculipennis*.

As I have not seen male-specimens, I do not know if the gonopoda are different.

Body : ♀ 30-35^{mm}; forewing : 35-36^{mm}; hindwing : 32-33^{mm};
abd. : ♀ 17-20^{mm}; gr. br. : 12-13^{mm}; gr. br. : 12-13^{mm}.

Habitat : India, Burma, Mysore, Malabar.

WALKER's type, a female, is from Malabar. MAC LACHLAN believed it to be the same as the insular *maculipennis* and quoted it as a synonym of that species. I found the above mentioned differences always constant and very distinct from *maculipennis*, but as I did not see males, it may be that the gonopoda are not different and that this form ought to be regarded as a subspecies.

I only examined a series of five females from the above quoted localities in the British Museum.

[**Hermes maculifera tonkinensis** Weele] (Planche III, fig. 22).

Hermes maculifera tonkinensis WEELE, Notes Leyden Mus., XXX, p. 255 (1909).

This form is very similar to *maculifera*, but the wings are relatively broader and the white spots less numerous, but larger. The basal white spot in the hindwings occupies also nearly half the wing, but in the anterior part there is an isolated large white spot, which in *maculifera* is always connected with the basal patch. On the hindborder the white colour surpasses the anal angle much farther, but the dark colour is not gradually increasing in breadth, but it ends with an acute prominency in the basal patch.

Body : 27-33^{mm}; forewing : 38-41^{mm}; hindwing : 34-37^{mm};
abd. : 9-20^{mm}; gr. br. : 13-14^{mm}; gr. br. : 14-15^{mm}.

Habitat : Tonkin.

I examined two specimens. One of them may be a male of which the gonopoda are damaged; it is labelled : « Tonkin 1907, CH. ALLUAUD ». The other specimen, a female, bears the indication : « Haut Tonkin et Bas Yunnan entre Man-Hao, Moung-Hùm (près Lao-Xay) et Ban-Nam-Coùn, lieutenant LESOURT 1905 ». The types are in the Museum of Paris and in that of Leyden.

Hermes Selysi Weele (Planche III, fig. 20).

Hermes Selysi WEELE, Notes Leyden Mus., XXX, p. 256 (1909).

This is probably only a local form or subspecies of *maculifera,* but without examples of the male sex it is impossible to elucidate this question in a satisfactory manner.

The distinctive characters are the following : about one third smaller; the spots in the forewings very small, point-like, the apical spots relatively half so small, only somewhat larger than in *sumatrensis;* in the hindwings the basal spot is very small and of an irregular trapezform, it reaches about to the middle of the analborder and is not connected with the other spots.

The female has the pronotum black, but in a specimen without abdomen, which is, judging from its smaller size, probably a ♂, the pronotum is pale orange without indications of black spots.

Body : ♀ 25^{mm}; forewing : 25-32^{mm}; hindwing : 23-29^{mm};
abd. : ♀ 10^{mm}; gr. br. : 9-11^{mm}; gr. br. : 8 $^{1}/_{2}$-11^{mm}.

Habitat : India, Sylhet, and Assam, Khasia Hills.

I examined four specimens, very similar to one another in regard to the pattern of the wings and their size. One of them, the smallest, has an orange-yellow pronotum. I believed it to be a ♂, but the abdomen and antennae are broken off. It is from Sylhet, collection SELYS,

and is labelled by Dr. HAGEN « *C. maculipennis* GRAY ». The three other specimens are undoubtedly females, all from the Khasia Hills; two of them are in my collection, the third is in the British Museum, purchased from the naturalist E. SWINHOE. In my collection is moreover a specimen from the last named locality, with orange prothorax but without abdomen and antennae, that I also consider to be a ♂, but the spots are larger and the basal spot of the hindwings is as large as in *maculifera,* to which it seems to form a transition. I bought my specimens from the naturalist W. F. H. ROSENBERG; probably the latter specimen has been incorrectly labelled.

I dedicate this species to the late baron E. DE SELYS LONGCHAMPS.

[**Hermes costatostriata** Weele].

Hermes costatostriata WEELE, Notes Leyden Mus., XXVIII, p. 249, textfig. 18, taf. 4, fig. 1 ♀ (1907).

About one third larger and more robust than the foregoing species. Easily to be distinguished in both sexes by the yellow-marginated costalveins of the forewings. The markings of these are similar to those of *maculifera* but smaller, the apical spot is large, though somewhat smaller than in this species. The hindwings have a basal spot, which has the same extension as in *maculipennis* or it is relatively a little smaller. The other spots are arranged as in this species.

The head is very broad, nearly quadrate, calling to mind that of *Protohermes*. The prothorax is orange, with four black spots as in *Neuromus*.

The male has appendices superiores which remember those of *maculipennis*, the branches are unequal, the lower being longer and its apex being curved inwards. The appendices inferiores are clawshaped and horizontally curved inwards. The genitalvalve is composed of two separated, triangular valves. As in the unique male I examined, the gonopoda are somewhat damaged, I could not observe the penis.

Body : ♂ 25mm, ♀ 40mm; forewing : ♂ 35mm, ♀ 39mm; hindwing : ♂ 32mm, ♀ 36mm;
abd. : ♂ 10mm, ♀ 20mm; gr. br. : ♂ 12mm, ♀ 13mm; gr. br. : ♂ 12mm, ♀ 13mm;
app. : ♂ 1 1/2mm.

Habitat : Khasia Hills, Assam.

The types (1 ♂ and 2 ♀♀) are in the Leyden Museum (coll. VAN DER WEELE). They have been purchased from the London naturalist W. F. H. ROSENBERG.

TRIB. CHAULIODINI.

The *Chauliodini,* which are easily distinguished from the *Neuromini* by the constant number (three) of the crossveins between the radius and radialsector, are moreover characterized by the triangular head, by the antennae which are moniliform to pectinate in the ♂ or in both sexes, and by the absence of the appendices inferiores in the ♂.

The eggs, larvae and pupae are about as in the *Neuromini,* but the North American species only are well studied in this regard. Of the other species nothing is known about their biology and metamorphosis.

The geographical distribution is much wider than that of the *Neuromini,* and they occur in tropical Asia, China, Japan, North America, Chili, New Zealand, Australia and South Africa.

The genera are closely related to one another. *Archichauliodes* is the most primitive and occurs in New Zealand, Australia and South Africa. *Protochauliodes,* from Chili, is most nearly related to it, and *Neohermes* is a more specialized derivent of *Protochauliodes*. *Chauliodes*

(North America) and *Parachauliodes* (China, Japan) are more directly related with *Protochauliodes*. *Parachauliodes* is the precursor of *Neochauliodes,* the asiatic genus that has at present its largest development. *Ctenochauliodes* (Asia) is a more specialized derivent of the latter and *Nigronia* (North America) is the most specialized genus of this tribe.

By the gonopoda of the ♂ and by the three crossveins between radius and radialsector, the *Chauliodini* are somewhat related with the more specialized *Sialidinae*.

KEY TO THE GENERA.

Antennae moniliform or subserrate in both sexes — 1.

Antennae pectinate in the male, moniliform or subserrate in the female — 2.

Antennae pectinate in both sexes. *Ctenochauliodes* n. g. (Asia). 70

Antennae very long in both sexes, reaching about at two thirds of the forewing, in the ♂ with a long pilosity at the joints. Appendices superiores bifurcated.

Neohermes Banks (America). 52

1. Antennae reaching about to, or beyond the middle of the forewings. Wings spotted all over with small pale fuscous dots, forming in some species confluent crossbands in the forewings, and in some other species larger spots between media and radialsector in the hindwings. Appendices superiores of the ♂ straight or forming a forceps, always longer than the last segment and neither truncated nor bifurcated at the apex.

Archichauliodes n. g. (New Zealand, Australia, South Africa). 46

The same as in *Archichauliodes,* but the appendices superiores of the ♂ truncated or slightly bifurcated. *Protochauliodes* n. g. (Chili). 41

Antennae subserrate in the ♂, moniliform in the ♀. Appendices superiores of the ♂ short and truncated. *Parachauliodes* n. g. (Japan, China). 59

2. Forewings spotted with many small dark points, which seldom form crossbands. Appendices superiores of the male moderately long, acute and straight.

Chauliodes Latreille (America). 54

Forewings as in *Chauliodes* and *Parachauliodes,* or with larger spots which form crossbands that can increase so much that the wing is nearly wholly dark coloured. Appendices superiores of the ♂ short, inconspicuous, truncated. *Neochauliodes* n. g. (Asia). 60

Wings nearly black, with some pale cream-white spots in the middle. Appendices superiores of the ♂ very short and inconspicuous. Penis long, placed in a long oval cavity of the last segment. Genitalvalve very small. Antennae longly serrate to pectinate in the ♂, subserrate in the ♀. *Nigronia* Banks (North America). 70

Genus **ARCHICHAULIODES** Weele (1909).

Weele, Notes Leyden Mus., XXX, p. 258 (1909).

Antennae moniliform or slightly subserrate in both sexes, long, reaching beyond the middle of the forewings.

Wings elongate-ovate, the forewings spotted with more or less inconspicuous dark points, scarcely forming some indistinct crossbands. The hindwings immaculate, or with traces of dark points in the apical half. Between media and radialsector two dark points, which can increase to round spots. Legs rather long and with a short pilosity. Appendices superiores of the ♂ long, curved or straight (in dried specimens often curved); the tuberculum is situated latero-ventralwards somewhat beyond the base.

Habitat : Australia, New Zealand, South Africa?

The forms belonging to this genus are of moderate or rather small size.

Type of the genus is *Hermes dubitatus* Walker from New Zealand, which, as to form, colour and pattern of the wings, calls to mind *Protochauliodes cinerascens, Metachauliodes japonicus* and *Chauliodes pectinicornis,* and which is undoubtedly the original form of all these genera.

The second form belonging to it, the australian *Hermes guttiferus* Walker, is somewhat higher specialized in the pattern of the wings, though the gonopoda are rather more primitive, but in regard to the wings it remembers somewhat the asiatic species of *Neochauliodes* with which it may have some relations.

The third form, provisionally placed in this genus, is the south african *Chauliodes pusillus* Mac Lachlan, which is still imperfectly known, as the antennae of the ♂ are quite unknown and the description of the gonopoda is insufficient. Judging from this description, it is however very probable that they are long and of a form similar to that of *guttiferus*. As to the wings it remembers the *Neochauliodes*-species, as those of the ♂ are broader and shorter than those of the female; the pattern is more like that of *dubitatus*.

The geographical distribution of these three primitive species is analogous with that of other primitive groups.

Archichauliodes dubitatus (Walker).

Hermes dubitatus Walker, Cat. Brit. Mus. Neur., p. 204, n° 6 (1853). — Mac Lachlan, Journ. Linn. Soc. Zool., XI, p. 260 (1867) (= *californicus* Walker).

= *Hermes diversus* Walker, *loc. cit.*, p. 205, n° 9 (1853). — Mac Lachlan, *loc. cit.*, p. 260 (1867). — Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908).

Chauliodes diversus Walker, Mac Lachlan, Ann. and Mag. Nat. Hist. (4) IV, p. 39 (1869). — Hudson, New Zealand Neuroptera, p. 45, pl. VII (1904) (♂♀ metam.). — Weele, Notes Leyden Mus., XXVIII, p. 253 (1907).

Antennae moniliform in both sexes, very long and nearly reaching the pterostigma in the male, shorter in the female. Body greyish brown, abdomen black, legs reddish brown with some whitish hairs.

Wings elliptical in the male, somewhat more strongly pointed in the female; membrane pale greyish brown, in the forewings with many small brown-grey points which follow the nervature and which are very similar to those of *californicus* Walker, but the points are larger and less numerous. There is a similar transverse band at the base of the forewings, but it is paler

and larger. A more indistinct and broader band beyond the middle, and an incomplete, similar, inconspicuous one originates from below the pterostigma and is only visible in dark coloured specimens.

In the hindwings the dark atoms in the nervature, apicalwards from the media, are more indistinct than in the forewings. The two brown points between media and radialsector are well developed.

The costalfield in the forewings is always speckled with grey-brown, that in the hindwings is hyaline. In both wings the region of the pterostigma is indicated by brown points.

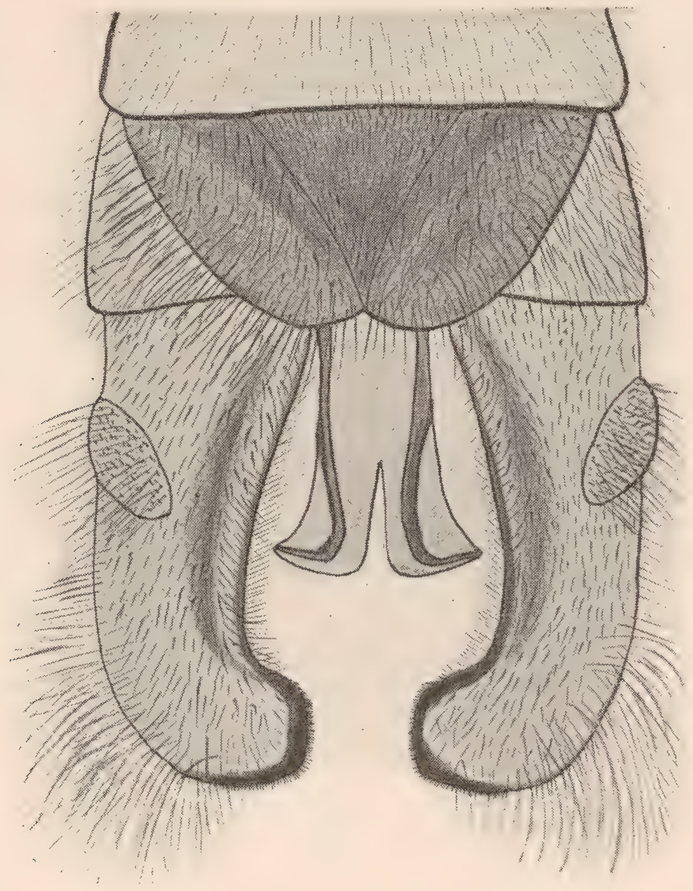

Fig. 34. — *Archichauliodes dubitatus* (Walker) ♂.
Gonopoda, underside.
(Coll. Selys.)

The gonopoda of the male (fig. 34) have a primitive character. The appendices superiores are long, curved inwards at their tip and form a distinct forceps. Their tips are chitinized and provided with dense, short, small spines. The tuberculum is situated latero-ventralwards as in *A. guttiferus*. The genitalvalve is somewhat shorter than in this species, but nearly of the same shape. The penis is furcated at the enlarged tip.

Body : ♂ 20-23^{mm}, ♀ 20^{mm}; forewing : ♂ 28-33^{mm}, ♀ 38^{mm}; hindwing : ♂ 25-30^{mm}, ♀ 35^{mm};
abd. : ♂ 10-13^{mm}, ♀ 10^{mm}; gr. br. : ♂ 8 $^{1}/_{2}$-9^{mm}, ♀ 12^{mm}; gr. br. : ♂ 9-9 $^{1}/_{2}^{mm}$, ♀ 12 $^{1}/_{2}^{mm}$;
ant. : ♂ 16^{mm}; cost. forewing ♂ : 22-24^{mm};
ant. : ♀ 12^{mm}; cost. hindwing ♀ : 20-22^{mm}.

Habitat : New Zealand.

Walker first described a female of this species without indication of locality as *Hermes dubitatus*. Misled by its resemblance with the north american *californicus,* Mac Lachlan united it first with this species, but two years later he referred it to *diversus,* giving however the priority to the latter name. Hudson did not reject this view. In 1906 I re-examined Walker's types and found Mac Lachlan's synonymical statements quite correct, but I gave the priority to *dubitatus*.

Hudson publishes a very interesting account concerning the biology and metamorphosis of this species.

In Selys' collection is a ♂ from New Zealand (Wakefield) with a label in Mac Lachlan's handwriting.

[**Archichauliodes guttiferus** (Walker)].

Hermes guttiferus Walker, Cat. Brit. Mus. Neur., p. 204, n° 5 (1853) (loc. inc.). — Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 260 (1869).

Chauliodes guttiferus Walker, Mac Lachlan, Ann. and Mag. Nat. Hist., (4), IV, p. 39 (1869). — Weele, Notes Leyden Mus., XXVIII, p. 252, textfigs. 19, 20, taf. 4, fig. 2 ♀ (1907).

Antennae dark brown, moniliform in both sexes, moderately long, reaching about the middle of the forewings. Head rather broad, greyish brown, eyes very large, grey. Prothorax rufous and grey, mesothorax, metathorax and abdomen brown. Legs fuscous, the femora and tibiae often rufous beneath. Wings smoky hyaline. In every cell of the forewings one to four very small brown points, only before and behind the region of the pterostigma a larger brown spot. The hindwings have the same spots in the pterostigmatical region; in the apicalfield there are some brown points and between the radialsector and media there are two very large, round, brown spots, which are often accompanied by a quadrate one, developed at the crossveins between the cubiti.

The appendices superiores of the ♂ are curved inwards and form a forceps in dried specimens. In a chitine-preparation they are straight and digitiform, with a dilatation at the dorsal part of the basalhalf, and the tuberculum is situated on the latero-ventralside. The genitalvalve is broad and short, with a slight incision at the tip and showing very clearly its pairy nature. The penis consists of a broad chitinous flap with pointed apex, the borders of which are erected.

Body : ♂ 25^{mm}, ♀ 20^{mm}; forewing : ♂ 25-28^{mm}, ♀ 28-29^{mm}; hindwing : ♂ 23-26^{mm}, ♀ 25-26^{mm}; ant. : ♂ 15^{mm}; abd. : ♂ 15^{mm}, ♀ 12^{mm}; gr. br. : ♂ 7-8^{mm}, ♀ 9^{mm}; gr. br. : ♂ 8-9^{mm}, ♀ 10^{mm}; ant. : ♀ 15^{mm}; app. : ♂ 1 $^{1}/_{2}$^{mm}.

cost. forewing : 24-30^{mm};
cost. hindwing : 22-28^{mm}.

Habitat : Australia.

Walker's type was without indication of locality, but Mac Lachlan received his examples from Australia, which general locality has, till now, always been recorded. I saw the type, and, in the Leyden Museum, specimens from Sydney, purchased from the Godeffroy Museum in Hamburg; moreover a specimen from Melbourne in the Paris Museum.

[**Archichauliodes? pusillus** (Mac Lachlan)] (Planche III, fig. 28, planche IV, fig. 36).

Chauliodes pusillus Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 231 (1867) (loc. inc.); Id., Ann. and Mag. Nat. Hist., (4), IV (1869). — Weele, Notes Leyden Mus., XXVIII, p. 256 (part.) (1907).

Chauliodes tenuis Mac Lachlan, Ann. and Mag. Nat. Hist., (4), IV, p. 38 (1869). — Weele, *loc. cit.*, p. 254 (1907).

Body lurid to greyish testaceous. Antennae in the female reaching about the middle of the forewing, greyish brown, moniliform; those of the male are unknown. Head elongate subtriangular in the ♂, in the ♀ somewhat narrower and rather quadrangular. The eyes very prominent in the ♂. Occiput with the usual linguiform markings. Ocelli yellow. Prothorax about 1 $^{1}/_{2}$ longer than broad, lurid brown like the meso- and metathorax. Legs ochraceous to brown, the femora paler, rather lurid. Abdomen dark brown.

Wings elongate and narrow in the female, in the male somewhat broader and shorter, with the tips more rounded. Membrane hyaline, with lurid or pale brown nervature, which in the forewings is all over transversely spotted with indistinct greyish brown points as in *californicus* Walker, but not forming transverse lines or spots as in this species. The region of the pterostigma is somewhat darker brown and in both sexes there are three distinct, brown points between radialsector and media in the forewings, and two in the hindwings. In the latter the brown points of the membrane are wholly or nearly wholly absent.

The gonopoda of the ♂ are unknown to me; they seem to be prominent and Mac Lachlan describes them as : « yellow; the superior curved strongly and parallel; the inferior short, somewhat dilated, appearing

to arise from the bases of the superior, and directed outwards ». As no inferior appendices exist in the *Chauliodini*, probably the superior ones are long and strongly spirally curved in the dried specimen, so that MAC LACHLAN may have regarded their tips as a pair of inferior ones.

Body : ♂ 15mm, ♀ 14mm; forewing : ♂ 19-21mm, ♀ 27mm; hindwing : ♂ 17-19mm, ♀ 23mm; ant. : ♂ ? ; abd. : ♂ 8mm, ♀ 5mm; gr. br. : ♂ 6-7mm, ♀ 8mm; gr. br. : ♂ 5 1/2-6 1/2 mm, ♀ 7mm; ant. : ♀ ± 10mm;
cost. forewing : 18-25;
cost. hindwing : 17-24.

Habitat : South Africa.

I examined photographs of MAC LACHLAN's types. That of *pusilius*, a small pale coloured ♂ without antennae, is in his own collection; the locality is unknown but it was suggested to be indian. So I identified in 1907, before I had seen the photograph of the type, my *khasianus* as this species, the description agreeing pretty well with it. I had no occasion to examine the type, and the photograph does not give an idea of the form of the gonopoda. The type of *tenuis*, a ♀ with shrunken abdomen, and not a ♂ as MAC LACHLAN indicates in his description, is from the Knysna district in South Africa. I examined it in 1906 and found that the abdomen is very much shrunken, so that MAC LACHLAN regarded it erroneously as a ♂. A third specimen, which I presume to be a ♂ and of which the abdomen and antennae are broken off, is in the Paris Museum; it is somewhat larger than the type of *pusillus* and its wings are darker coloured, quite as in the female. It is indicated : « Afrique australe, DELALANDE ».

Genus **PROTOCHAULIODES** Weele (1909).

WEELE, Notes Leyden Mus., XXX, p. 258 (1909).

Antennae and wings as in *Archichauliodes*, but the wings can be wholly dark so that no pattern is developed. The appendices superiores of the ♂ are truncate or slightly bifurcate at the apex, much shorter than in the genus *Archichauliodes*, but much longer than in the genus *Neochauliodes*.

Habitat : Chili.

Hitherto only two closely related forms are known, of which *Ch. cinerascens* BLANCHARD is the type of the genus. They belong to the largest species of the group and their geographical distribution is interesting, as they are the only south american species known as yet. Chili is a zoogeographically interesting territory, as many primitive animals are living there. *P. cinerascens* is, in all its characters, the original form of *Neohermes*, which occurs along the west-coast of the United States.

Protochauliodes cinerascens (Blanchard) (Planche III, fig. 23).

Chauliodes cinerascens BLANCHARD in GAY, Hist. Chile, vol. 6, Neur., pl. 2, fig. 10 (1851). — MAC LACHLAN, Ann. and Mag. Nat. Hist., (4) IV, p. 41 (1869). — DAVIS, Bull. New York State Mus. 68, Ent. 18, p. 464 (1903). — BANKS, Proc. Ent. Soc. Wash., X, pp. 27, 29 (1908).
= *C. chilensis* HAGEN i. l., Syn. Neur. N. Amer. app., p. 321 (1861).

This interesting species was hitherto only characterized by the short diagnosis given by BLANCHARD. The later authors did not know it by sight and so it still wanted redescription. I had a very good couple at hand, from which I derived the following description.

Antennae blackish brown, very long and slender in the male and nearly moniliform in both sexes. Colour of the body brown, the head and thorax variegated with orange, which latter

colour can take the place of the brown, so that these parts are nearly wholly orange. Legs and abdomen blackish brown like the antennae. Wings long and narrow, acute, of a light brown or ashy ground-colour, which is marked with many small pointlike dark grey or brown spots, that are nearly equal in size, only that of the pterostigma in the forewings is a little larger. The forewings are spotted all over with these markings, the hindwings only in the pterostigmatical region and between the radialsectors, in the female; in the male there are also indistinct points between the nervules of the cubiti. In both sexes are two very distinct, small, brown points between radialsector and cubitius superior, each situated at the inside of the two basal crossveins between them.

Gonopoda of the male (figs. 35, 36) very robust, but not very prominent. Last tergit broad, chestnutbrown, shining. Appendices superiores very broad and robust, with obtuse,

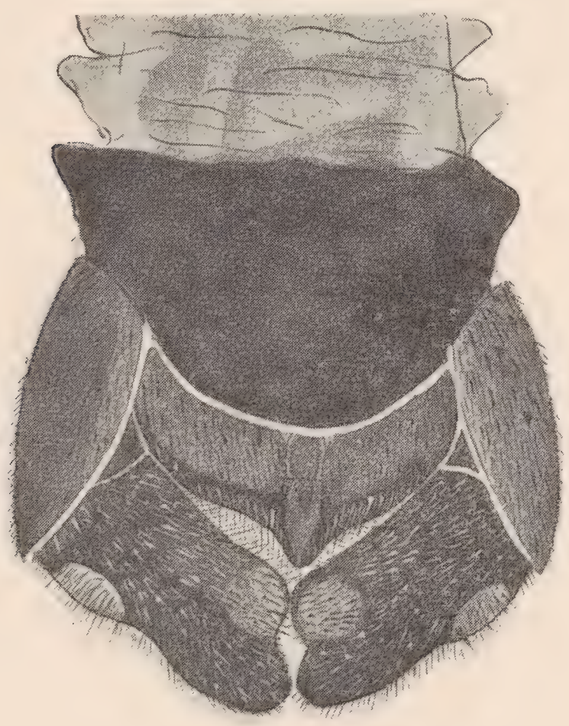

FIG. 35. — *Protochauliodes cinerascens* (Blanchard) ♂.
Gonopoda, underside.
(British Museum.)

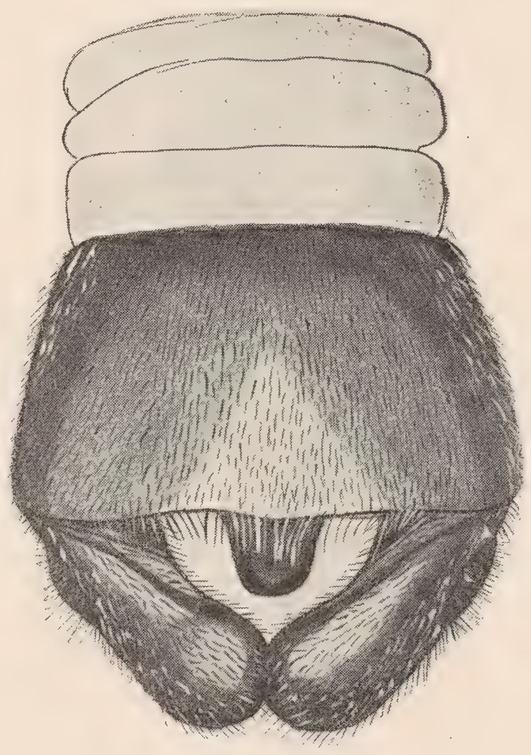

FIG. 36. — *Protochauliodes cinerascens* (Blanchard) ♂.
Gonopoda, upperside.
(British Museum.)

straightly cut off apices which seem to be bifurcated; they form a short forceps. The tuberculum is placed on the lateral side of it and is very distinct. The genitalvalve is like an obtuse triangle, the apex of which is directed upwards between the appendices superiores. The female has very slender short appendices superiores, which are slightly directed upwards.

Body : ♂ ± 30^{mm}, ♀ ± 40^{mm}; forewing : ♂ 40^{mm}, ♀ 59^{mm}; hindwing : ♂ 36^{mm}, ♀ 53^{mm};
ant. ♂ 20^{mm}; cost. v. : 31^{mm};
abd. : ♂ ± 16^{mm}, ♀ ± 20^{mm}; gr. br. : ♂ 11 $^{1}/_{2}$^{mm}, ♀ 17^{mm}; gr. br. : ♂ 11 $^{1}/_{2}$^{mm}, ♀ 17^{mm};
ant. : ♀ ? ; cost. v. : 25-28^{mm};
app. : ♂ 1 $^{1}/_{2}$^{mm}.

Habitat : Chili.

One female, of which the antennae are broken off, from Tringuinida? Chili, LANASTI, in the collection SELYS, one male from Valparaiso, Chili, 800 ft. S. COLEMAN, CRAWFORD-Expedition 1903, in the British Museum, and a male from the same locality in the collection of Pat. L. NAVÁS are the materials I compared.

Protochauliodes humeralis (Banks) (Textfig. 39).

Neohermes humeralis Banks, Proc. Ent. Soc. Wash., X, pp. 27, 29 (1908).

This species, the second known from Chili, is relatively smaller than *cinerascens,* though of the same general form. It differs from it in the following points :

Head orange, the eyes, mouthparts, space between the antennae and ocelli black. Antennae black like in *cinerascens*. Body and legs deep black. Wings dark smoky brown, the humeri orange, the veins darker. With the exception of the two small points between radialsector and cubitius superior, there are no other traces of dark markings or spots. Only a few cross-veins between the branches of the radialsector are whitish in both wings.

Fig. 37. — *Protochauliodes humeralis* (Banks) ♂.
Gonopoda, upperside.
(Coll. Selys.)

Fig. 38. — *Protochauliodes humeralis* (Banks) ♂.
Gonopoda, underside.
(Coll. Selys.)

Fig. 39. — *Protochauliodes humeralis* (Banks) ♂.
(Coll. Selys.)

Gonopoda of the male (figs. 37, 38) relatively larger than in *cinerascens,* deep shining black. The last tergit very broad and flat. Appendices superiores relatively longer, clubshaped,

with the broadened tips curved downwards and forming a forceps. The genitalvalve with three lobes, the median of which is the longest. In the female the appendices superiores are smaller and relatively more slender. The last and last but one sternits are shining black.

Body : ♂ 22mm, ♀ 29mm; forewing : ♂ 31mm, ♀ 36mm; hindwing : ♂ 26mm, ♀ 32mm;
abd. : ♂ 13mm, ♀ 17mm; gr. br. : ♂ 8 1/2mm, ♀ 10 1/2mm; gr. br. : ♂ 8 1/2mm, ♀ 10 1/2mm;
ant. : ♂ ? cost. forew. : 24-29mm;
ant. : ♀ 14mm, cost. hindw. : 20-26mm;
app. : ♂ 2mm.

Habitat : Chili.

I examined a couple; the male is in the collection SELYS and bears the erroneous indication « Brésil », the female is in the British Museum and is indicated : Chile, Mulchen, H. J. ELWES 1902. BANKS' types are from Santiago, Chili (M. J. RIVERA).

Genus **NEOHERMES** Banks (1908).

BANKS, Proc. Ent. Soc. Wash., X, p. 29 (1908). — WEELE, Notes Leyden Mus., XXX, p. 258 (1909).

Antennae of the ♂ very long and slender, reaching more than two thirds of the length of the forewing, moniliform, each joint provided with a wreath of long hairs. In the female the antennae are shorter, subserrate and without pilosity.

Wings elongate-ovate, not enlarged in the middle, with many small dark atoms which seldom form short and narrow, incomplete crossbands in the basal portion of the forewing. The gonopoda of the ♂ are characterized by the bifurcated appendices superiores and by the large genitalvalve.

Habitat : United States.

Type of the genus is *Ch. californicus* WALKER, which occurs in the United States and has a very large geographical distribution. It is somewhat subjected to individual variation and so it has been described under several names.

A nearly related form, *Ch. disjunctus* WALKER, which is however not sufficiently known, is brought provisionally in this genus.

No doubt *Neohermes* is developed from *Protochauliodes*.

BANKS first describes (*l. c.* p. 27) *Neohermes humeralis* and afterwards he indicates (*l. c.* p. 29) his *Chauliodes filicornis* as the type of the genus, and *Ch. californicus* WALKER, *angusticollis* HAGEN, *cinerascens* BLANCHARD and *Neoh. humeralis* BANKS all as belonging to it. As his *filicornis* is a synonym of *californicus* WALKER, the genus ought to be maintained for this latter species. The name is very unlucky chosen, as *Hermes* is a genus of the *Neuromini* and combinations of it were much better used in that tribe than in others.

[**Neohermes californicus** (Walker)] (Planche III, fig. 26).

Chauliodes californicus Walker, Cat. Brit. Mus. Neur., p. 199 (1853). — Hagen, Syn. Neur. N. Amer., p. 190 (1861). — Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 259 (1867); Ann. and Mag. Nat. Hist. (4) IV, p. 40 (1869). — Davis, Bull. New York State Mus. 68, Ent. 18, p. 463 (1903). — Banks, Trans. Amer. Ent. Soc., p. 21 (1907).

= *Chauliodes angusticollis* Hagen, *l. c.*, p. 191 (1861). — Mac Lachlan, *l. c.*, p. 40 (1869). — Banks, Trans. Amer. Ent. Soc., XIX, p. 357 (1892). — Davis, *l. c.*, p. 462 (1903). — Banks, *l. c.*, p. 20 (1907).

= *Chauliodes concolor* Davis, *l. c.*, p. 462 (1903).

= *Chauliodes minimus* Davis, *l. c.*, p. 463 (1903).

= *Chauliodes filicornis* Banks, Proc. Ent. Soc. Wash., V, p. 238 (1903).

Colour of body brownish grey. Antennae of male very long, reaching about the middle of the forewing, brownish black, moniliform, the articulations thickened and black, with a ring of long, erected bristles. In the female the antennae are shorter and moniliform.

Labrum and mouthparts yellow. Breast with whitish, long hairs. Legs blackish brown, the femora yellowish beneath. Wings long and narrow, with front- and hindborder nearly parallel. Tips obtuse, rounded. Nervature brown in the forewings, in the hindwings also, except in the part basalwards from the media, where it is yellowish. Membrane greyish in the forewings and in the apical part of the hindwings, with very numerous, small, transverse points or short lines, that are placed along the veins, and in the cells of the costal-area of both wings. In the hindwings these points are smaller and less distinct, and here are also two dark points between the radialsector and the media. The pterostigma is indicated in both wings by a dark elongate spot at the frontborder, consisting of a great number of suffused black points. In the forewings is in the basal fourth a black, narrow, transverse line, running from the radius towards the hindborder, being mostly paler in the posterior part.

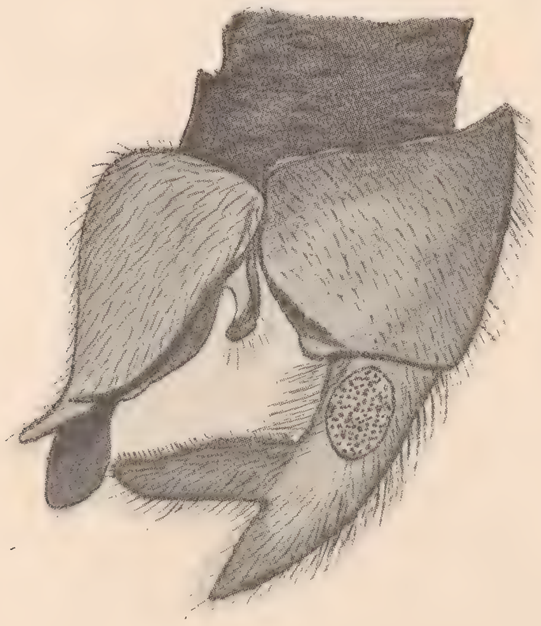

Fig. 40. — *Neohermes californicus* (Walker) ♂.
Gonopoda, lateral view.
(British Museum.)

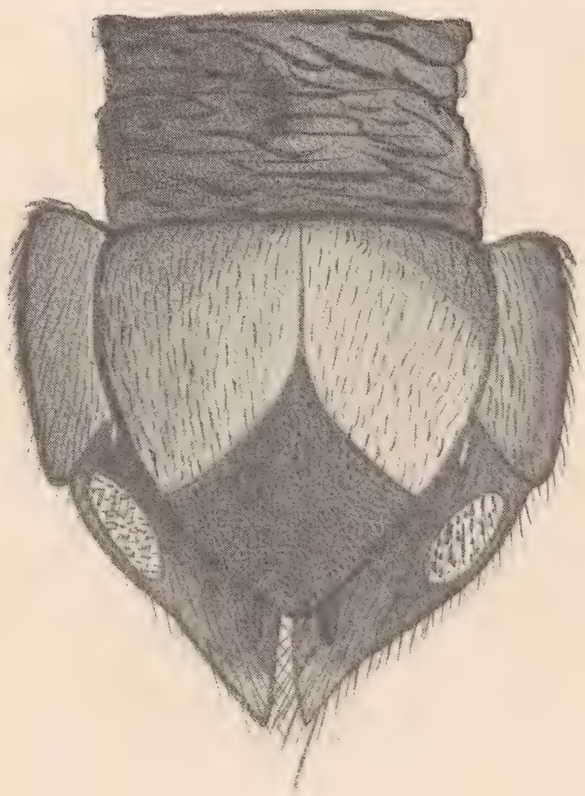

Fig. 41. — *Neohermes californicus* (Walker) ♂.
Gonopoda, underside.
(British Museum.)

The gonopoda of the male (figs. 40, 41) are nearly hidden in the broad ultimate tergit. The appendices superiores are 2^{mm} long, directed downwards and with the tips to one another; they are bifurcated and the lower branch is the longest. The genitalvalve is very large, triangular, with rounded sides; the apical half

is thinner and punctulated in a rhomboidal form. The penis ends in two parallel tips, which are often visible on the border of the genitalvalve.

Body : ♂ 28mm, ♀ 32mm; forewing : ♂ 40mm; hindwing : ♂ 35mm; ant. : ♂ 27mm;
abd. : ♂ 14mm, ♀ 15mm; gr. br. : ♂ 12mm; gr. br. : ♂ 11 1/2mm; ant. : ♀ 15mm;
cost. forewing : ♂ 25-28mm, ♀ 27mm;
cost. hindwing : ♂ 21-25mm, ♀ 26mm.

Habitat : United States of America.

WALKER's description having been taken from a male of which the antennae were broken off, this species has been misunderstood by many later authors. HAGEN described specimens from the south-eastern States under the name of *Ch. angusticollis*. DAVIS accepted both and described moreover two species, viz. *concolor* from New York, and *minimus* from California. Both are however synonymical with *californicus; minimus* was based on a somewhat smaller individual; I examined a female of an alar-expanse of 65mm, which does not seem to differ from larger specimens. The differences pointed out in the descriptions are merely individual. In the same year as DAVIS, BANKS described this species from Arizona under the name *filicornis*. I examined the types of WALKER and of BANKS as well as photographs of those of HAGEN and of DAVIS, so that I cannot doubt that all the differences indicated by these authors fall within the sphere of individual variation.

[**Neohermes disjunctus** (Walker)] (Planche III, fig. 25).

Chauliodes disjunctus WALKER in LORD, a Naturalist in Vancouvers Island and British Columbia, II, p. 334 (1866). — MAC LACHLAN, Ann. and Mag. Nat. Hist. (4) IV, p. 40 (1869). — DAVIS, Bull. New York State Mus. 68, Ent. 18, p. 463 (1903).

This species, only known to me by the type, is probably merely a somewhat aberrant individual of *californicus,* but having no other materials from that locality for comparison, I prefer to record the differences that I found between it and the continental form.

Body etc. as in *californicus,* but as the antennae are broken off in the type, these are unknown to me. Wings spotted in the same way, but darker and the points larger. The humerus of the forewings black and the narrow crossband is wholly absent. The hindwings nearly all over spotted with fuscous dots, the dark points between media and radialsector are very indistinct.

Body : ♀ 40mm; forewing : 53mm; hindwing : 47mm; cost. forewing : 30mm;
abd. : ♀ 20mm; gr. br. : 15mm; gr. br. : 15mm; cost. hindwing : ?.

Habitat : Vancouvers Island.

DAVIS quotes also California and describes the antennae as very short, brown and pilose. Probably his specimen was a male of which the antennae partially were broken off. According to a photograph of the type, which is in the British Museum, I believed this species to be an aberration of *californicus,* but certainty is only to be acquired with the aid of more materials from the same locality and by an examination of the gonopoda. I could not consult WALKER's original description.

Genus **CHAULIODES** Latreille (1802).

LATREILLE, Hist. Nat. Crust. et Ins., III, p. 290 (1802); ID., *l. c.*, XIII, p. 43 (1804). — BURMEISTER, Handb. Entom., II, p. 949 (1839). — RAMBUR, Hist. Ins. Névropt., p. 443 (1842). — WALKER, Cat. Brit. Mus. Neur., p. 198 (part.) (1853). — HAGEN, Syn. N. Amer. Neur., p. 189 (part.) (1861). — MAC LACHLAN, Ann. and Mag. Nat. Hist. (4) IV, p. 36 (1869). — DAVIS, Bull. New York State Mus., 68, Ent. 18, p. 453 (part.) (1903).
= *Semblis* FABRICIUS, Species Insectorum, I, p. 386 (part.) (1781).

Antennae pectinate in both sexes or in the ♂ only. Wings elongate-ovate, not much enlarged in the middle. Nervature yellow or brown, spotted with fuscous points and stripes in the forewings. Membrane of forewings clouded with pale fuscous transverse bands as in *Proto-*

chauliodes dubitatus (Walker). Colour of the body luteo-fuscous. Gonopoda of the ♂ characterized by the pointed appendices superiores, which are curved or straight, with the tuberculum situated near the base at the lateral side. Penis bifid at the tip.

Habitat : United States of America and Canada.

Type of the genus is *Hemerobius pectinicornis* L. which is the type-species of Latreille. The later authors described some other discordant species in this genus. Fabricius' *Semblis,* Spec. Ins. I (1781), is a synonym of it, but in the oldest description of this genus, Syst. Entom. p. 305 (1775), *Neuronia phalaenoides* L. has been described first, must therefore be regarded as the type of it and *Semblis* is consequently a synonym of *Neuronia,* which belongs to the *Trichoptera*. The second species referred to it is *Ch. rastricornis* Rambur, that has the same distribution as *pectinicornis* and is somewhat higher specialized by the gonopoda and nervature.

The relation to *Protochauliodes* downwards and to *Metachauliodes* upwards is very clear.

The biology and development of both species is pretty well observed and described by the american entomologists, and both species do not seem to be very rare in the countries where they occur.

* **Chauliodes pectinicornis** (Linné) (Planche III, fig. 24).

Hemerobius pectinicornis Linné, Amoen. Acad., VI, p. 412 (1763); Centur. Insect., pp. 29, 87 (1763); Syst. Nat. Ed. 12, p. 911, n° 1 (1766). — De Geer, Mém. Ins., III, p. 562, t. 27, fig. 3 (1773). — Fabricius, Syst. Entom., p. 309 (1775). — Palisot, Ins. Afric. et Amer. Neur., t. 1, fig. 2 (1821). — Drury, Ins. Ed. Westwood, I, p. 105, t. 46, fig. 3 (1837).

Semblis pectinicornis Fabricius, Spec. Insect., I, p. 386 (1781); Mant. Ins., I, p. 244 (1787); Entom. Syst., II, p. 72 (1793).

Chauliodes pectinicornis Latreille, Gen. Crust. Ins., III, p. 198 (1807); Hist. Nat. Crust. et Ins., III, p. 290 (1802); *l. c.*, XIII, p. 43 (1804). — Cuvier, Règne animal, p. 14, t. 105, fig. 2 (1849). — Burmeister, Handb. Ent., II, p. 950 (1839). — Rambur, Ins. Névropt., p. 444 (1842). — Walker, Cat. Brit. Mus. Neur., p. 198 (1853). — Hagen, Syn. Neur. N. Amer., p. 189 (1861). — Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 259 (1867); Ann. and Mag. Nat. Hist. (4) IV, p. 40 (1869). — Banks, Trans. Amer. Ent. Soc., XIX, p. 357 (1892). — Needham, Bull. New York State Mus., 47, p. 547, pl. 26, fig. 1 (1901) (with many indications of important literature). — Banks, Ins. New Yersey, p. 52 (1900). — Davis, Bull. New York State Mus., 68, Ent. 18, p. 461 (1903). — Banks, Trans. Amer. Ent. Soc., p. 22 (1907); Proc. Ent. Soc. Wash., X, p. 30 (1908).

= *Hemerobius virginiensis* Drury, Ill. Nat. Hist., V, p. 2 app. (1773).

Chauliodes virginiensis Drury, Ins. Ed. Westwood, I, p. 105, pl. 46, fig. 3 (1842). — Hagen, Syn. Neur. N. Amer., p. 190 (1861). — Mac Lachlan, Ann. and Mag. Nat. Hist. (4) IV, p. 40 (1869). — Banks, Trans. Amer. Ent. Soc., XIX, p. 357 (1892).

Antennae similarly pectinate in both sexes, those of the male only slightly longer pectinate than those of the female. Colour of the body luteous-brown, legs luteous, abdomen black.

Wings with a pale greyish ground-colour, the hindwings somewhat paler, immaculate, with brown or luteous-brown nervature. In the forewings the nervature is yellow, interrupted

by brown points and more or less dark grey clouds in the membrane, which clouds are most distinct in the basal third. The furcation of the radialsector is not strongly indicated in the forewings, the anterior branch, which runs nearly parallel with the radius, has mostly four parallel branches, the first of which originates nearly at the same point where the first crossvein between radius and radialsector joins the latter. The wings are rather broad, with acutely rounded tips and the costalfield of the forewings is suddenly dilated in the basal third. The costalveins are numerous.

The gonopoda of the male (fig. 42) are yellow, the appendices superiores are 1 $^1/_2$ mm long, clawshaped, parallel, the tips are sharp and the innerside is somewhat curved. In a chitine-preparation the penis is visible as dark brown, bi-cornous organs, of which the branches are united in the middle by a thin chitinous lamella. The ventral plate has a prominent, linguiform flap at the hindborder.

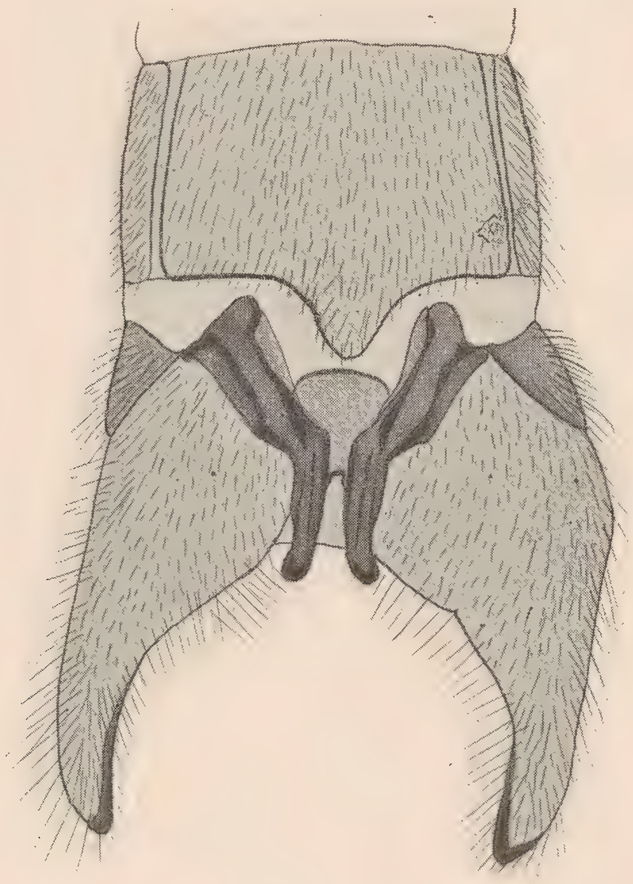

FIG. 42. — *Chauliodes pectinicornis* (L.) ♂.
Gonopoda, underside.
(Leyden Museum.)

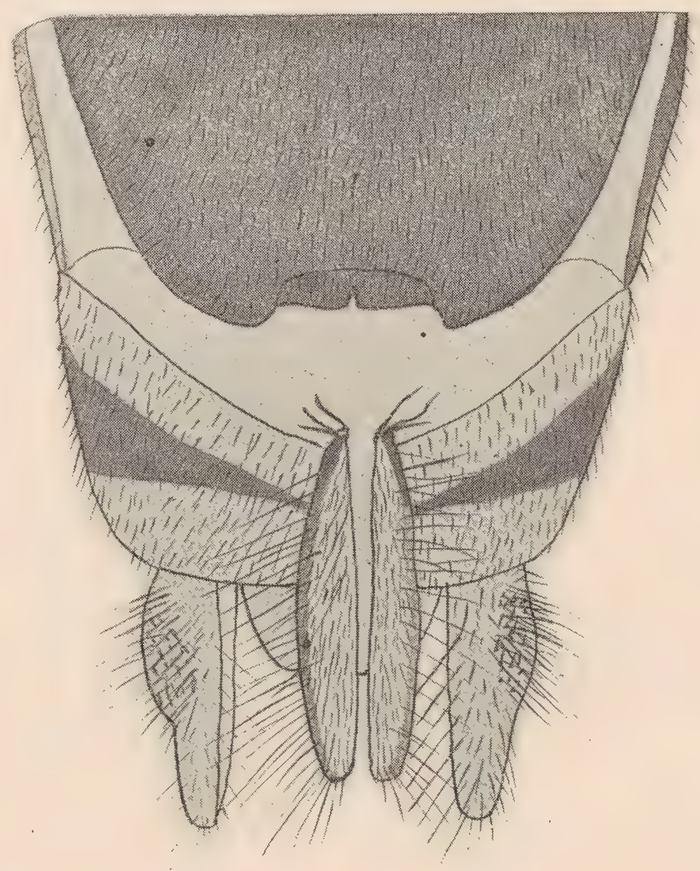

FIG. 43. — *Chauliodes pectinicornis* (L.) ♀.
Gonopoda, underside.
(Leyden Museum.)

In the female the appendices superiores (fig. 43) are, as a rule, much less developed, but they are directed parallel with one another as in the male. The genitalvalves are long and clubshaped, not narrowed at the base; the last sternit is nearly quadrangular at the apical part, with a particular, short, longitudinal excision in the middle of the hindborder.

Body : ♂ 19mm, ♀ 30-35mm; forewing : ♂ 35-41mm, ♀ 43-49mm; hindwing : ♂ 30-36mm, ♀ 39-45mm;
abd. : ♂ 8mm, ♀ 15-20mm; gr. br. : ♂ 12-13mm, ♀ 14-16mm; gr. br. : ♂ 11-12mm, ♀ 13-15mm;
ant. : ♂ 10mm; cost. forewing : ♂ 31-34mm, ♀ 40mm;
ant. : ♀ 12-14mm; cost. hindwing : ♂ 27-31mm, ♀ 32-37mm.

Habitat : Eastern States of the United States and Canada.

The biology and development of this species are very well known (cf. NEEDHAM). It seems to be rather common and is the oldest known species of this group.

In the collection SELYS are nine specimens from LATREILLE's and RAMBUR's collections, PROVANCHER in Canada and Virginia PALISOT. Among them is also PALISOT's specimen, which is labelled by HAGEN « *virginiensis* », but which is merely a larger female-specimen from Virginia.

Chauliodes rastricornis Rambur (Planche III, fig. 27).

Chauliodes rastricornis Rambur, Hist. Ins. Névropt., p. 444 (1842). — Walker, Cat. Brit. Mus. Neur., p. 198 (1853). — Hagen, Syn. N. Amer. Neur., p. 189 (1861); Proc. Ent. Soc. Philad., II, p. 181 (1863). — Walsh, ibidem, II, p. 263 (1863). — Mac Lachlan, Ann. and Mag. Nat. Hist., (4) IV, p. 40 (1869). — Banks, Trans. Amer. Ent. Soc., XIX, p. 357 (1892); Ins. New Yersey, p. 52 (1900). — Needham, Bull. N. York State Mus., 47, p. 456 (1901). — Davis, ibidem, 68, Entom. 18, p. 460 (1903). — Banks, ibidem, p. 22 (1907); Proc. Ent. Soc. Wash., X, p. 30 (1908).

= *Hermes indecisus* Walker, Cat. Brit. Mus. Neur., p. 204 (1853). — Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 260 (1867).

This species is very similar to *pectinicornis* and in collections it is often mixed with this species. It is however easily to be distinguished from it, by the following characters.

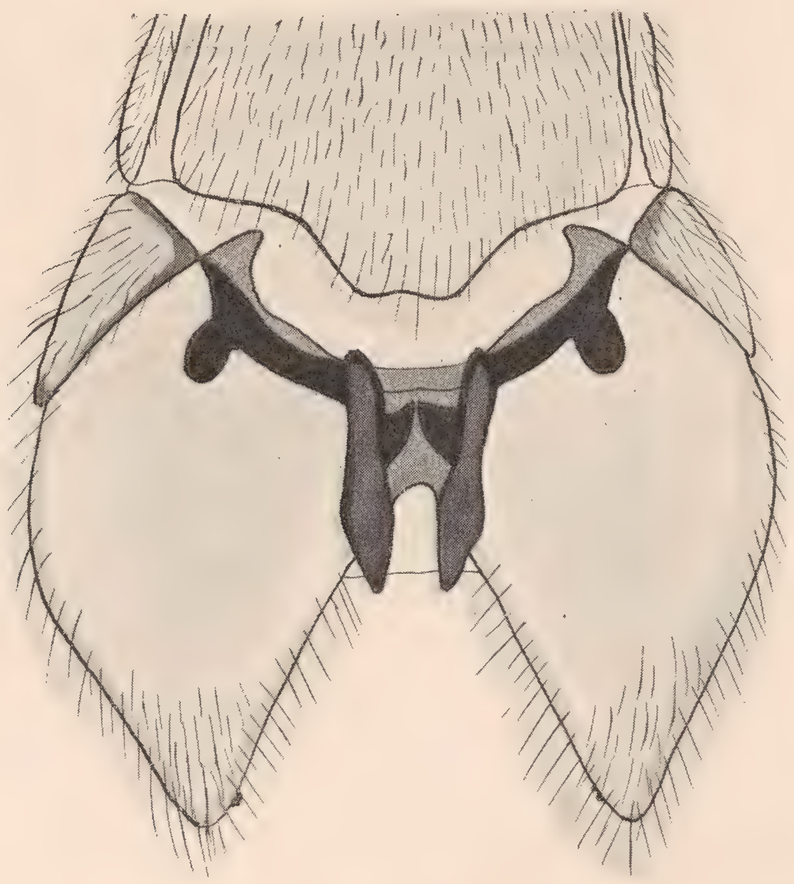

Fig. 44. — *Chauliodes rastricornis* Rambur ♂.
Gonopoda, underside.
(Leyden Museum.)

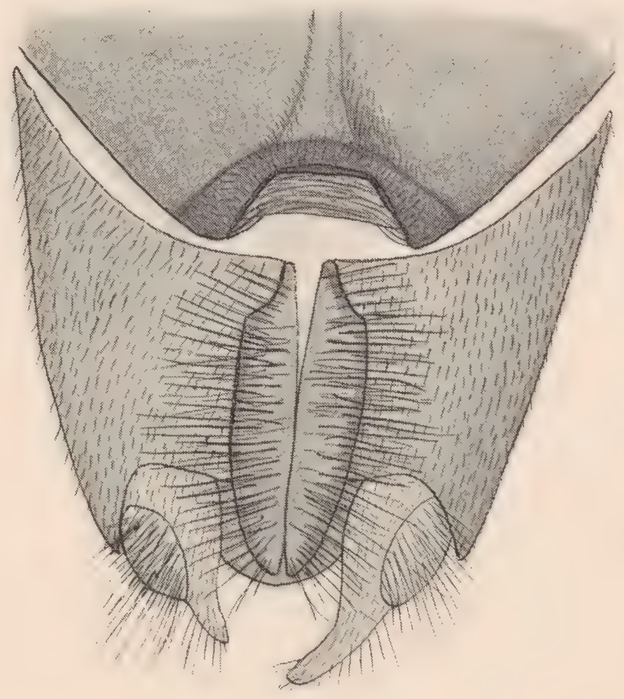

Fig. 45. — *Chauliodes rastricornis* Rambur ♀.
Gonopoda, underside.
(Leyden Museum.)

Antennae in the male more longly pectinate than in *pectinicornis,* in the female moniliform or subserrate.

The colour of the body is somewhat darker, rather brown, with black spots. Legs darker, brown, with darker articulations. Abdomen black.

Wings of the same colour and pattern, but narrower and more strongly pointed at the apex; the costalfield much less dilated and the costalveins less numerous. The anterior branch of the radialsector very conspicuous, dark at its base, the connecting crossvein indistinct, yellow, *the first branch originates much farther removed from the junction than the length of the radialsector to its origin mesures.*

The gonopoda are very distinct, those of the male (fig. 44) have flap-shaped, broad, triangular appendices superiores, which are about 1^{mm} long and folded to one another, so that

they are very inconspicuous. The penis is also quite different and the genitalvalve has a trapeziform prominence in the middle of the hindborder. In the female (fig. 45) the appendices superiores are also curved to one another, and at the apex the genitalvalves are clubshaped, broader, very narrowed at the base. The last sternit is trapezoid in its distal half, with a carina in the middle and a trapeziform incision at its apex.

Body : ♂ 18mm, ♀ 16-25mm; forewing : ♂ 31mm, ♀ 29-40mm; hindwing : ♂ 29mm, ♀ 26-37mm;
abd. : ♂ 12mm, ♀ 7-10mm; gr. br. : ♂ 10mm, ♀ 9-12 1/2 mm; gr. br. : ♂ 9mm, ♀ 8 1/2-12 1/2 mm;
ant. : ♂ 15mm; cost. forewing : ♂ 25mm, ♀ 24-26mm;
ant. : ♀ 11-13mm; cost. hindwing : ♂ 22mm, ♀ 22-24mm.

Habitat : Eastern States of the United States and Canada.

In the Selys' collection is the type of Rambur, a ♀ with the original label in his handwriting, and 4 other ♀♀ from different origin.

Development and biology are described by Needham and other authors.

Genus **PARACHAULIODES** Weele (1909).

Weele, Notes Leyden Mus., XXX, p. 259 (1909).

This genus remembers *Chauliodes* in its habitus and coloration of the wings. It is distinguished from it by the antennae, which are serrate in the ♂ and subserrate in the ♀. The gonopoda of the ♂ have a development which is intermediate between *Chauliodes* and *Neochauliodes,* as the appendices superiores are truncate and the penis has an acute, not bifid, tip.

No doubt this genus is also nearly related to *Protochauliodes* in regard to the form of the gonopoda. It is the precursor of *Neochauliodes*.

Habitat : Japan and Korea.

Type of the genus is *Ch. japonicus* Mac Lachlan. Nothing is known about the development nor about the biology of the species.

* **Parachauliodes japonicus** (Mac Lachlan) (Planche IV, fig. 29).

Chauliodes japonicus Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 232 (1867); Ann. and Mag. Nat. Hist., (4) IV, p. 38 (1869); Trans. Ent. Soc. London, 1875, p. 174 (1875). — Weele, Notes Leyden Mus., XXVIII, p. 254 (1907). — Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908).

Similar to *dubitatus* Walker but much larger. Colour of the body dull brown, the head yellowish or reddish, with dark, longitudinal streaks on the occiput, which join between the antennae. Mouthparts yellowish, tips of mandibles black. Thorax brown, with traces of yellow spots in the middle. Abdomen blackish brown, with red-brown hairs. Antennae black, reaching about the middle of the forewing, subserrate in both sexes, in the ♂ somewhat more distinctly.

Wings grey-brown, long and narrow, the apex pointed. Membrane grey-brown, nervature yellow to brown, with dark points in the forewings. Numerous brown round spots on the nervature and on the membrane, often fused to indistinct, irregular, transverse lines. In many individuals however the spots are nearly invisible and seem then to be much less numerous. Pterostigmatical region brown. In the hindwings the two brown points between radialsector and media are more or less distinctly visible and there are also traces of dark spots apicalwards from them.

The gonopoda of the male (figs. 46, 47) are relatively very small and inconspicuous. The appendices superiores are nearly quadrate, with a round incision at the apex, when seen

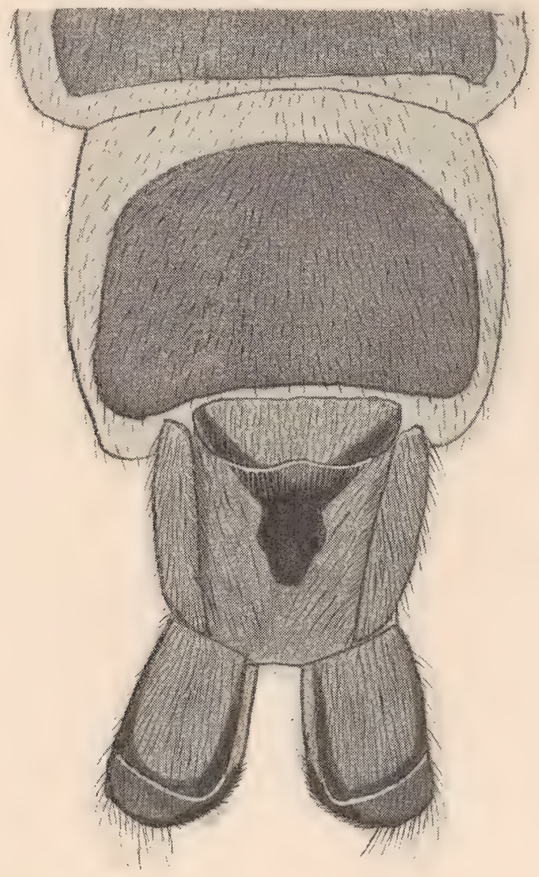

FIG. 46. — *Parachauliodes japonicus* (Mac Lachlan) ♂.
Gonopoda, underside.
(Leyden Museum.)

FIG. 47. — *Parachauliodes japonicus* (Mac Lachlan) ♂.
Gonopoda, lateral view.
(Leyden Museum.)

sideways. The tuberculum is oval and situated near the tip. The last tergit is very narrow, at least one half narrower than the foregoing, and, in dried specimens, often retracted under the foregoing ones. The genitalvalve is very short, broad, with a shallow incision at its tip.

The penis is black, strongly chitinized, with a hastate obtuse tip.

Body : ♂ 28-30^{mm}, ♀ 30-32^{mm}; forewing : ♂ 38-54^{mm}, ♀ 41-56^{mm}; hindwing : ♂ 33-49^{mm}, ♀ 37-51^{mm};
abd. : ♂ 17-19^{mm}, ♀ 18-20^{mm}; gr. br. : ♂ 12-16^{mm}, ♀ 14-17 $^{1}/_{2}$^{mm}; gr. br. : ♂ 12-16^{mm}, ♀ 14-17 $^{1}/_{2}$^{mm};
app. : ♂ 1 $^{1}/_{2}$^{mm}.

ant. ♂ 17-23^{mm}; cost. forewing : 27-32^{mm};
ant. ♀ 18-23^{mm}; cost. hindwing : 22-29^{mm}.

Habitat : Japan.

MAC LACHLAN described the female and indicated later on (1875) that he has not seen males, but this is an error, as the specimen mentioned by him from SELYS' collection, is a male. I saw specimens from Nagasaki, Tokio and Yokohama; according to some labels the species flies in May. In SELYS' collection is a couple collected by PRYER, with the general indication « Japan ».

[**Parachauliodes continentalis** Weele] (Planche IV, fig. 30).

Parachauliodes continentalis Weele, Notes Leyden Mus., XXX, p. 259 (1909).

Nearly related to *japonicus* and very similar to it, but distinct by the more robust body, broader and shorter wings, which are darker coloured, and by the gonopoda.

Fig. 48. — *Parachauliodes continentalis* Weele ♂.
Gonopoda, lateral view.
(British Museum.)

Antennae nearly wholly broken off in the type-specimens, black, in the male serrate as in *japonicus*, so far the remaining basal part shows.

Head and body a little darker than in *japonicus*. Legs fuscous, reddish beneath.

Wings of the same form and colour, but shorter and relatively broader, with the same nervature, but the longitudinal veins seem to be a little darker. The spots are larger and less numerous, but also very indistinct. The pterostigma is very dark-coloured in both wings.

The gonopoda of the male (fig. 48) differ in the following points : Appendices superiores broader than long, trapeziform, without an excision at the hindborder, which is straight and oblique. Tuberculum oval, larger, situated at the lower angle of the hindborder and parallel with it. Penis and genitalvalve invisible in the single dried type-specimen.

Body : ♂ 33mm, ♀ 32mm; forewing : ♂ 47mm, ♀ 46mm; hindwing : ♂ 42mm, ♀ 41mm;
abd. : ♂ 20mm, ♀ 16mm; gr. br. : ♂ 15mm, ♀ 14 1/2mm; gr. br. : ♂ 15mm, ♀ 14 1/2mm;
app. : ♂ 1 1/2mm.
cost. forewing : 29-30mm;
cost. hindwing : 28-29mm.

Habitat : Korea, Tsu-shima.

One couple of this species, that substitutes *japonicus* on the continent. The male is indicated : Tsu-shima 27 May 1891 (H. t.), the female : Tsu-shima 31 May 1891 (H. t.); both are from the Seebohm-bequest 96-103. Types in the British Museum.

Genus **NEOCHAULIODES** Weele (1909).

Weele, Notes Leyden Mus., XXX, p. 259 (1909).

Antennae pectinate in the male, subserrate in the female. Wings rather broad and short, with rounded or curved tips. Pattern varying from indistinct simple round spots to oblique bands, combined with dark distinct points. In some cases these bands can occupy nearly the whole wing.

Gonopoda of the ♂ characterized by short, truncated appendices superiores, which have a tuberculum laterally at the base. The penis is simple and acute at the tip.

Habitat : Continental Asia and Insulinde.

The species belonging to this genus are certainly higher specialized than those of *Metachauliodes* from which it surely is derived. The most primitive species, as *simplex, indicus* and *khasianus,* remember much those of *Archichauliodes* and *Metachauliodes,* and are gradually connected with the most specialized forms. I regard it as the genus of the group that is still in mutation.

The type is *Neochauliodes sinensis* (Walker).

[**Neochauliodes simplex** (Walker)] (Planche IV, fig. 31).

Chauliodes simplex Walker, Cat. Brit. Mus. Neur., p. 200, n° 5 ♂ (1853). — Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 259 (1867); Ann. and Mag. Nat. Hist., (4) IV, p. 39 (1869). — Weele, Notes Leyden Mus., XXVIII, p. 256 (1907).

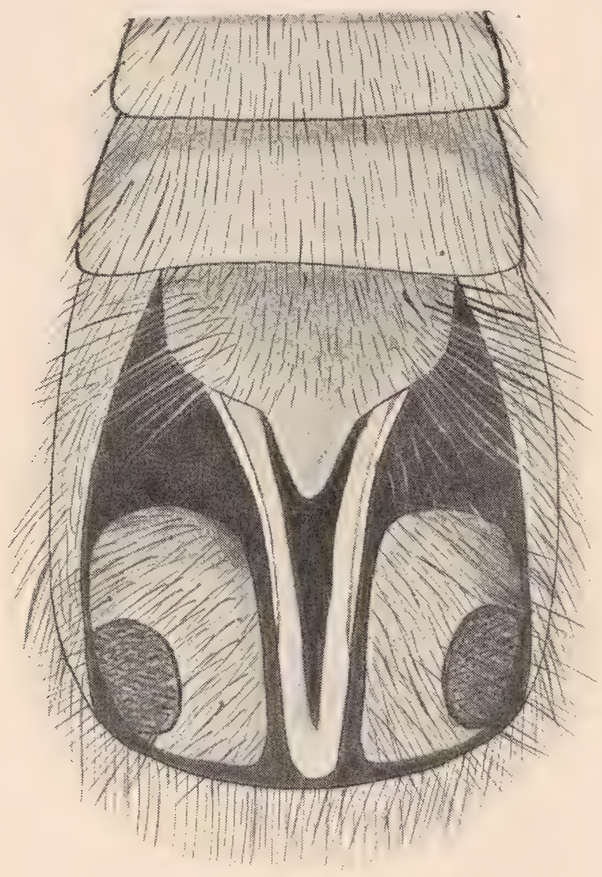

Fig. 49. — *Neochauliodes simplex* (Walker) ♂.
Gonopoda, underside
(after a dried type-specimen).
(British Museum.)

Body dull brown, the prothorax red-brown and the hindborder of the mesothorax rather yellow-brown. Mouthparts luteous. Legs red, the articulations and feet darkbrown above. Antennae black, longly pectinate in the male.

Wings rather broad, the membrane reddish grey, with indistinct traces of small brown points in the costalfield and between the radialsectors. Nervature red-brown, only some crossveins in the apical area seem to be whitish when seen under a certain light.

Pterostigma whitish in both wings, a large brown spot at both sides of it, the basal one being the largest, having about the same length as it. Humeri yellow.

The gonopoda of the male (fig. 49) are characterized by the long, slender penis, the borders of which are narrowly raised. The genitalvalve is semicircular, with a linguiform prominence at the tip. The appendices superiores have the usual form.

Body : ♂ 13^{mm}; forewing : 29-30^{mm}; hindwing : 25-27^{mm}; ant. : 10^{mm};
abd. : ♂ 6^{mm}; gr. br. : 10^{mm}; gr. br. : 10^{mm};
cost. forewing : 21^{mm};
cost. hindwing : 20^{mm}.

Habitat : Sylhet.

I examined the three males from Sylhet, Mr. Anderson's collection, mentioned by Walker as his types.

[**Neochauliodes khasianus** Weele].

Chauliodes pusillus Weele nec Mac Lachlan, Notes Leyden Mus., XXVIII, p. 256, taf. 4, fig. 4 ♂ (1907).

Neochauliodes khasianus Weele, *l. c.*, XXX, p. 259 (1909).

Nearly allied to *simplex* but considerably smaller, with relatively much narrower and more strongly spotted wings. The pterostigmatical markings are very indistinct in the forewings and absent in the hindwings. The forewings are spotted with numerous, very indistinct, greyish brown spots, which give the membrane a nearly uniform, greyish brown tinge. Hindwings much paler than the forewings, without distinct markings. In both wings are three brown points between radialsector and media. Nervature brown, the crossveins yellowish white. The costal-area of the forewings is dark-coloured.

Body grey-brown. Antennae very long, reaching beyond the middle of the forewings, black, longly pectinated on one side. Legs long, femora red, tibiae brown, tarsi nearly black.

Gonopoda of the male small, red, appendices superiores rather long and slender, with a large tubercle at the base. The genitalvalve is broad and semicircular.

Body : 10mm; forewing : 22mm; hindwing : 20mm; ant. : 13mm;
abd. : 4mm; gr. br. : 7mm; gr. br. : 7mm;
cost. forewing : 20mm;
cost. hindwing : 20mm.

Habitat : Assam, Khasia Hills.

I believed this species, judging from the description, to be *Ch. pusillus* Mac Lachlan, of which the origin was unknown. After having compared a photograph of the type, I perceived my error and I recognized the species to be new. The number of costalveins (17-18), given in my first description, was counted to the pterostigma, instead of the total number of all costalveins, which now is given in all my descriptions. The type, a male indicated Khasia Hills and purchased in 1906 from Watkins, is in my collection in the Leyden Museum.

Neochauliodes indicus (Weele).

Chauliodes indicus Weele, Notes Leyden Mus., XXVIII, p. 255, figs. 21, 22, taf. 4, fig. 3 ♀ (1907).

Closely allied to *simplex* and *khasianus,* but larger than the first and much darker coloured than *khasianus*.

As it is nearest to *simplex,* I will compare it especially with this species.

Somewhat larger and distinguished from it by the larger and more distinct ante- and post-pterostigmatical spots in both wings. The costal-area of the forewings is dark-coloured in the basal two thirds by vinaceous round spots, which are situated on the front- and hindborder of the cells; they are often confluent, occupying the cells entirely. The basal half of the forewing shows a great many of round indistinct spots, more or less confluent and the apical half is nearly uniformly vinaceous with white spots. The nervature is brown, except in the pale spots and the crossveins which are whitish. The hindwings are immaculated in the basal half and in the apical half they are like the forewings.

Body etc. as in *simplex,* legs darker, tibiae blackish brown, feet black. Antennae black, in the ♂ like in the other species, in the ♀ subserrate.

Gonopoda of the male differing by the strong quadrate appendices superiores, which are chitinized at the inner border. The genitalvalve is small, semicircular. The penis is broad at the base, with raised borders and narrow linguiform tip, which is directed upwards.

Body : ♂ 21^{mm}?, ♀ 27^{mm}; forewing : 35-43^{mm}; hindwing : 31-38^{mm}; ant. : ♂ 16^{mm};
abd. : ♂ 11^{mm}?, ♀ 14^{mm}; gr. br. : 12-14^{mm}; gr. br. : 12-14^{mm}; ant. : ♀ 15^{mm};
cost. forewing : 35^{mm};
cost. hindwing : 31^{mm}.

Habitat : Assam, Sikkim, Bhootan.

The types are in the Berlin- and in the Leyden Museum.

I examined another female from Darjeeling, ATKINSON, in the collection SELYS and a female from Bhootan, Maria Basti (Mgr. DUREL), collection R. OBERTHÜR 1898, in the Paris Museum.

* [**Neochauliodes sinensis** (Walker)].

Chauliodes sinensis WALKER, Cat. Brit. Mus. Neur., p. 199 (1853). — MAC LACHLAN, Journ. Linn. Soc. Zool., IX, p. 259 (1867); Ann. and Mag. Nat. Hist., (4) IV, p. 38 (1869). — GIRARD, Traité élémentaire, II, tab. 68, fig. 4 (1876). — WEELE, Notes Leyden Mus., XXVIII, p. 261, figs. 25, 26 (1907).

Colour of body varying from yellow to piceous. Antennae black, longly pectinated and reaching to the middle of the forewing in the male, shorter and moniliform in the female.

Legs brown, femora testaceous.

Wings subhyaline, broad, with angustated tips, which are somewhat falcated. Before the pterostigma is a large brown streak, which continues in the disk of the wing into an oblique brown streak, that reaches the cubitus. Its form is rather variable and it is more oblique in the hind- than in the forewings. The costal- area is immaculate in the hindwings, in the forewings there are some large, brown dots in the middle of it, but there are never distinct points or series of points. The subcostal- area is maculated in the forewings, in the hindwings the spots are much reduced. The apicalborder of both wings is clouded with brown and some larger spots are distinct in it. In the forewings are some well marked brown dots between the origins of media and cubiti and at the crossveins between them.

The gonopoda of the male are characterized by the semicircular genitalvalve, that is prolonged in an obtuse point in the middle. The penis is broad and rather short; it has the form of a very elongated trapezium and the borders are broad and slightly raised, so that they include a linguiform shallow space.

Body : 18-25^{mm}; forewing : 30-36^{mm}; hindwing : 27-32^{mm}; ant. : 12^{mm};
abd. : 7-15^{mm}; gr. br. : 10 $^{1}_{2}$-12^{mm}; gr. br. : 10 $^{1}_{2}$-12 $^{1}_{2}$ ^{mm};
cost. forewing : 29-36^{mm};
cost. hindwing : 26-33^{mm}.

Habitat : China and North China.

WALKER's types are dark-coloured males from North China and China. The spots of the wings are less distinct and this form is very well represented by the figure given by GIRARD. I saw specimens from the mounts north of Pekin and Kiang-si, A. DAVID coll., and from the Kouy-Young, CAVALERIE et FORTUNAT coll. 1906 (Paris Museum).

[**Neochauliodes sinensis fraternus** (Mac Lachlan)] (Planche IV, fig. 32).

Chauliodes fraternus Mac Lachlan, Ann. and Mag. Nat. Hist., (4) IV, p. 37 (1869). — Weele, Notes Leyden Mus., XXVIII, p. 254 (1907).

Differs from the typical *sinensis* by its larger size and by the absence of the oblique bands in both wings, which bands are merely indicated by some brown points. The dark spots seem to be somewhat more numerous and there are grey clouds in the discal- and apical cells of the forewing and in the apical cells of the hindwing.

The male is unknown to me, but probably it is still paler and less spotted, as in this group it is a rule that the females appear darker coloured than the males.

Body : 28mm; forewing : 51mm; hindwing : 46mm; ant. : 15; cost. forewing : 46mm;
abd. : 14mm; gr. br. : 18mm; gr. br. : 18mm; cost. hindwing : 33mm.

Habitat : North China.

The type, a female, is in the British Museum.

The body etc. is dark-coloured. Mac Lachlan indicated wrongly in his description that it is especially related to *japonicus*. I was of his opinion till 1907 but changed this view after a re-examination of the type.

[**Neochauliodes sinensis occidentalis** Weele] (Planche IV, fig. 40).

Chauliodes sinensis Weele, Notes Leyden Mus., XXVIII, p. 262 (part.) (1907).
Neochauliodes sinensis occidentalis Weele, Notes Leyden Mus., XXX, p. 260 (1909).

This form is also somewhat larger than the typical *sinensis* and is characterized by the milky hyaline membrane on which the dark pattern is very distinct.

The oblique band of the forewings is larger and mostly connected with the dark ante-pterostigmatical spot. The oblique band of the hindwings is narrower, nearly equal in breadth or gradually pointed towards the hindborder.

The male is distinguished from the female by its less distinct pattern and narrower bands.

Body : ♂ 27mm, ♀ 38mm; forewing : ♂ 38mm, ♀ 48mm; hindwing : ♂ 34mm, ♀ 43mm; ant. : ♂ 15mm;
abd. : ♂ 15mm, ♀ 22mm; gr. br. : ♂ 14mm, ♀ 16mm; gr. br. : ♂ 14mm, ♀ 16mm;
cost. forewing : 33-37mm;
cost. hindwing : 29-34mm.

Habitat : Omei Shan, Western China.

I examined a series from this locality in the collections of the British- and of the Berlin Museum.

[**Neochauliodes sinensis meridionalis** Weele] (Planche IV, fig. 33).

Neochauliodes sinensis meridionalis Weele, Notes Leyden Mus., XXX, p. 260 (1909).

Nearest related to *sinensis occidentalis* and of the same size, but distinct from it by the darker coloured wings.

The hindborder and abdominal border of the posterior wings is suffused with fuscous and connected with the oblique band, which is broader at the posterior end. The marginal and submarginal apical spots of the forewing are very distinct and clear, and the marginal ones are suffused together into a narrow fuscous border. In the hindwings this border is much broader.

Habitat : Southern China.

One male labelled « Mou-Pin 1899, coll. R. Oberthür » and one female from « Haut-Tonkin et Bas Yunnan entre Man-Hao, Moung-Hum (près Lao-Kay) et Ban-nam-coun, lieutenant Lesourt 1905 », both types in the Museum of Paris.

[**Neochauliodes koreanus** Weele] (Planche IV, fig. 39).

Neochauliodes koreanus Weele, Notes Leyden Mus., XXX, p. 261 (1909).

This form is nearly related to *sinensis* and very probably merely a subspecies of it; but, as the material is as yet too scanty to decide that question, I describe it provisionally as a distinct species.

Body fuscous, the prothorax orange or fuscous with traces of an orange colour. Wings smaller than in *sinensis* but of the same form, very dark-coloured by the increase of the fuscous colour, so as to leave only a triangular spot at the base of the wings, included between the radius, cubitus and first row of crossveins, and another smaller, more trapeziform one in the apical-area, hyaline. The apical hyaline spot ends obtusely denticulated. In the forewings the corresponding hyaline patches extend over a larger area and are very irregular, often connected with other hyaline spots. The costal-area is hyaline in both wings, except in the forewings, where a brown patch, in the middle of it, can be divided into smaller spots.

Body : 22^{mm}; forewing : 33-35^{mm}; hindwing : 30-32^{mm}; ant. : 12^{mm};
abd. : 9^{mm}; gr. br. : 13^{mm}; gr. br. : 11 $^{1}/_{2}$^{mm};
cost. forewing : 28-33^{mm};
cost. hindwing : 26-29^{mm}.

Habitat : Korea.

Two females, differing in the distribution of the fuscous colour, the paler one labelled : Seoul, Korea, Hon. E. Scarlett, Aug. 1900-251, Happy Valley, Hong Kong Peak, the darker one with the only indication : Hong Kong, 97-261. — Types in the British Museum.

Neochauliodes subfasciatus (Westwood).

Chauliodes subfasciatus Westwood, Cab. Orient. Ent., p. 70, pl. 34, fig. 5 (1848). — Walker, Cat. Brit. Mus. Neur., p. 200 (1853). — Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 259 (1869); Ann. and Mag. Nat. Hist., (4) IV, p. 39 (1869). — Weele, Notes Leyden Mus., XXVIII, p. 258 (1907).

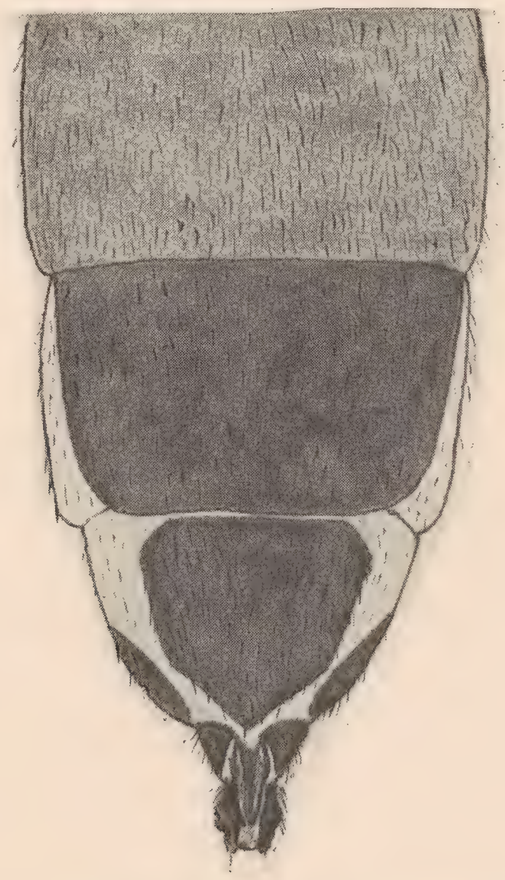

Fig. 50. — *Neochauliodes subfasciatus* (Westwood) ♀.
Gonopoda, underside.
(Coll. Selys.)

Related and very similar to the typical form of *sinensis*, but easily distinguished by its smaller size and much darker coloured wings.

Nearly half the size of *sinensis*. The basal half of the costal-area of the forewings fuscous, interrupted by hyaline transverse streaks at the veins or in the middle of the cells. Humerus orange. Oblique band very broad, connected with the fuscous hindborder and with the broad fuscous tip, so as to include a subapical hyaline space, which begins narrowly in the region of the pterostigma and increases towards the middle of the disc, where it shows numerous dark points and patches at its borders. The basal space is less distinctly defined than the subapical one; it begins as a twice broader white patch in the costalfield before the dark band and has a great many of large, ill-defined, fuscous dots, which can occupy a large space of it.

The hindwings have nearly the same pattern, but the hyaline subapical patch is larger and shows no fuscous points; the basal one occupies the basal third of the wing and has only some fuscous spots. The costalfield is hyaline, except the spot where the fuscous band begins. Nervature fuscous, except in the hyaline parts where it is whitish.

Body, legs and antennae fuscous. Antennae pectinate in the ♂, serrate in the ♀.

The female has a pentagonal ultimate sternit (fig. 50). The gonopoda of the ♂ are unknown.

Body : ♂ 15^{mm}, ♀ 17^{mm}; forewing : 23-26^{mm}; hindwing : 20-23^{mm}; ant. 5^{mm};
abd. : ♂ 7^{mm}, ♀ 10^{mm}; gr. br. : 8-10^{mm}; gr. br. : 8-9 $^{1}/_{2}$^{mm};
cost. forewing : 25^{mm};
cost. hindwing : 22-25^{mm}.

Habitat : Sylhet.

Coll. SELYS : 1 ♀, Sylhet.

I examined WESTWOOD's types, two ♂♂ in the British Museum and one ♀ from the same locality in the coll. SELYS. Unfortunately the abdomen of the ♂♂ are broken off, consequently I cannot give indications about the gonopoda.

[**Neochauliodes Bowringi** (Mac Lachlan)].

Hermes sinensis WALKER, Cat. Brit. Mus. Neur., p. 203 (1853) (nom. preocc.).

Chauliodes sinensis BRAUER nec WALKER, Novara Exp., Bd. I, p. 102 (1865).

Chauliodes Bowringi MAC LACHLAN, Journ. Linn. Soc. Zool., IX, p. 260 (1867) (nom. nov.); Ann. and Mag. Nat. Hist., (4) IV, p. 39 (1869). — WEELE, Notes Leyden Mus., XXVIII, p. 259, figs. 23, 24, taf. 5, fig. 2 ♀ (1907).

Nearest related to *sinensis,* but differing from it by the narrower and longer wings, the tips of which are much more obtuse and rounded. Colour of body, legs etc. like *sinensis*. The pattern of the wings similar but the oblique dark bands are less oblique and broader in the hindwings, often as broad as in *subfasciatus*. The brown points in the apical and basal parts vary much in number and size. The costalfield of the forewings has always in its basal half and often over its whole length, two brown points in each cell; in the hindwings it is quite hyaline.

The gonopoda of the ♂ differ from those of *sinensis* by the longer genitalvalve, which is about trapeziform, and by the much longer penis, of which the lateral borders are raised and the tip is elongated and linguiform.

Body : 30^{mm}; forewing : 29^{mm}; hindwing : 32^{mm}; ant. ♀ 12^{mm}; cost. forewing : 24-30^{mm};
abd. : 17^{mm}; gr. br. : 12^{mm}; gr. br. : 12 $^{1}/_{2}$^{mm}; cost. hindwing : 22^{mm}.

Habitat : China, Hong Kong.

WALKER's type is a female from Hong Kong. I examined this specimen and that of BRAUER, which is a paler female, surely belonging to this species. I also saw specimens from Canton in the Berlin Museum and a dark-coloured female with the indication « Tonkin central, environs de Yen-Bai, A. WEISS, Avril 1901 » in the Paris Museum.

[**Neochauliodes dispar** (Weele)].

Chauliodes dispar Weele, Notes Leyden Mus., XXVI, p. 219, textfigs. 4, 5, taf. 16, fig. 4 ♂ (1905). — Id., *l. c.*, XXVIII, p. 143 (1906). — Id., *l. c.*, p. 258 (1907).

This species remembers in the form of the wings *N. sinensis,* but its pattern is that of dark-coloured *Bowringi*-specimens. Body etc. as in these species but considerably smaller.

The gonopoda of the ♂ are quite different from those of *bowringi* and remember more or less those of *sinensis*, but the penis is much broader and its tip is also broader. The genitalvalve is semicircular, without any prominence at the tip.

Body : 15mm; forewing : 27mm; hindwing : 28mm; cost. forewing : 26mm;
abd. : 8mm; gr. br. : 11mm; gr. br. : 9mm; cost. hindwing : 23mm.

Habitat : North-East Sumatra.

The type, a male of which the antennae are broken off, originating from Tandjong Morawa, Serdang, North-East Sumatra and collected by Dr. B. Hagen, is the only specimen known. It is in the Leyden Museum.

Neochauliodes tonkinensis (Weele).

Chauliodes tonkinensis Weele, Notes Leyden Mus., XXVIII, p. 260, taf. 5, fig. 3 ♀ (1907).

This species equals in size the largest individuals of *japonicus* and is the largest form of this genus. It is nearest to *Bowringi* and differs from it in the following points :

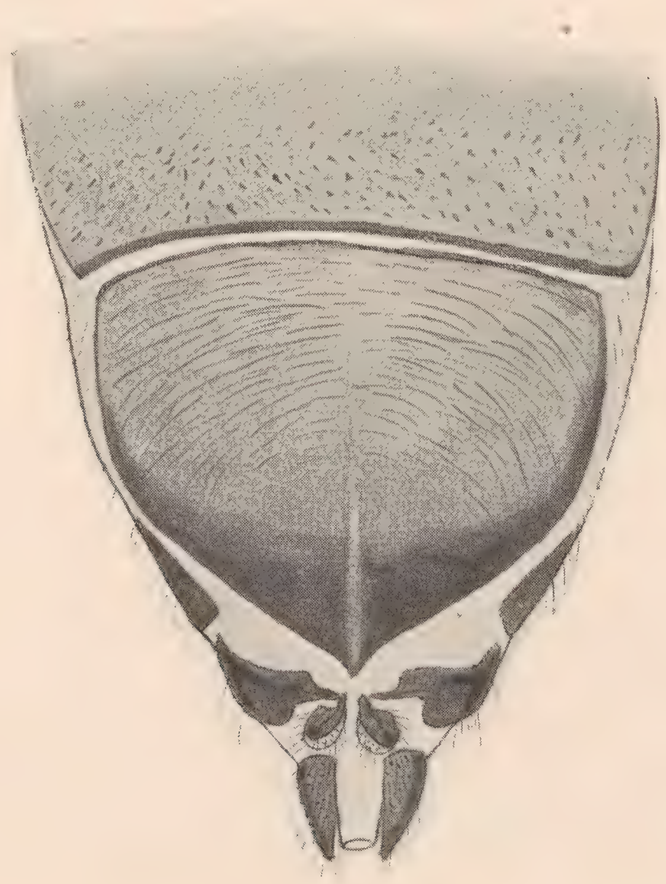

Fig. 51. — *Neochauliodes tonkinensis* (Weele) ♀.
Gonopoda, underside.
(Coll. Selys.)

In both wings, which are narrower and more pointed to the apex, the brown, oblique band is suffused with the brown apex, so that the apical two thirds of both wings are brown, with many indistinct fuscous spots and with hyaline-bordered crossveins. The hyaline basal third is in the forewing much spotted, with more dark brown points than in the hindwings, where are only

traces of it. Very distinct in both wings is a row of dark brown dots along the radius. The costalveins are dark brown, the costalfield is hyaline in the hindwings, spotted with brown points in the forewings.

Body brown with traces of an orange colour on the labrum, underside of the head and thorax, in immature specimens wholly orange. Legs fuscous, femora and coxae orange, knees fuscous. Abdomen black. In the female the last sternit is very large, nearly triangular, with an acute apex from which a sharp carina proceeds, which carina gradually diminishes towards the proximal border. The genitalvalves (fig. 51) are very small, leafshaped and the appendices superiores are also very small.

Body : 37mm; forewing : 53mm; hindwing : 48mm; cost. forewing : 35-37mm;
abd. : 17mm; gr. br. : 18mm; gr. br. : 18mm; cost. hindwing : 35mm.

Habitat : Tonkin.

Only two females are known. The antennae of both are broken off. Both are collected by H. FRUHSTORFER. The type in the Leyden Museum is from Central Tonkin, Chiem Hoa, August-September. The other specimen is in the collection SELYS. It is a very immature female, of which the wings have a nearly uniform pale fuscous colour, in which only traces of the points between radialsector and media and of some of the darkest spots are visible. It has been collected in the Mauson Mountains, April to May, 2-3000', and was presented by H. FRUHSTORFER.

[**Neochauliodes punctatoguttatus** (Weele)].

Chauliodes dispar WEELE, Notes Leyden Mus., XXVI, p. 219, taf. 16, fig. 5 ♀ (part.) (1905).
Chauliodes punctatoguttatus WEELE, *l. c.*, XXVIII, p. 143 (1906). — ID., *l. c.*, p. 262 (1907).

Head and thorax orange, immaculate. Abdomen black. Legs fuscous, posterior femora brown, the anterior and median ones red-brown in their basal half. Antennae black, subserrate in the female. Wings elongate, with acute tips, hyaline, with red humeri. Anterior wings spotted with numerous, small, pale fuscous dots, which form irregular, short fasciae in the apical half and at the exterior margin. The region of the pterostigma is also fuscous in both wings, but the costalfield is hyaline with fuscous costalveins. The subcostalfield is punctated with fuscous.

The hindwings are nearly hyaline, except traces of some fuscous spots in the apical part.

Body : 23-27mm; forewing : 33-36mm; hindwing : 28-32mm; ant. : 12mm; cost. forewing : 26mm;
abd. : 9-13mm; gr. br. : 11-14mm; gr. br. : 10-11mm; cost. hindwing : 25mm.

Habitat : Java.

The two types, both females, are in the Vienna Museum. I saw no other specimens.

[**Neochauliodes sundaicus** (Weele)].

Chauliodes sundaicus WEELE, Notes Leyden Mus., XXVIII, p. 143, textfig. (1906). — ID., *l. c.*, p. 262, taf. 5, fig. 4 ♂, 5 ♀ (1907).

Nearly related with *punctatoguttatus* but distinguished from it by the broader and shorter wings with rounded tips. The dark dots are much less numerous and are more confined to the disc, where they form in the basal third of the forewing two arched cross-fasciae. The costalveins are dark fuscous in both wings and the marginal veins are, especially in the apical part, broadly bordered with fuscous. The hindwings have only the two dark points between media and radialsector, but in the forewings there are some brown dots distalwards from the pterostigma, and most of the crossveins of the disc are broadly bordered with fuscous. Nervature yellow in the hyaline parts, fuscous in the dark ones.

Body yellow, a dark spot between the ocelli and a dark point on meso- and metathorax at the base of each wing. Abdomen black. Legs yellow, anterior and median tibiae brown above, tarsi brown. Antennae black, longly pectinate in the ♂, subserrate in the ♀.

Gonopoda of the ♂ of the usual form, but the appendices superiores have an excision at the apex and the penis is very broad at the base, then strongly narrowed, and gradually narrowed into an acute tip.

Body : ♂ 15mm, ♀ 21-28mm; forewing : ♂ 22mm, ♀ 32-36mm; hindwing : ♂ 21mm, ♀ 29-31mm; ant. : ♂ 11mm;
abd. : ♂ 8mm, ♀ 11-13mm; gr. br. : ♂ 10mm, ♀ 13-15mm; gr. br. : ♂ 8mm, ♀ 12-13mm; ant. : ♀ 11mm;
cost. forewing : ♂ 22mm, ♀ 28-29mm;
cost. hindwing : ♂ 20mm, ♀ 23-26mm.

Habitat : Java and Sumatra.

The types, a ♂ from Deli and two ♀♀, one from Sumatra, the other from West Java, are in the Berlin Museum.

[**Neochauliodes sundaicus borneensis** Weele] (Planche IV, fig. 37).

Neochauliodes sundaicus borneensis Weele, Notes Leyden Mus., XXX, p. 261 (1909).

I believe this form to be the bornean subspecies of *sundaicus,* though it differs considerably from it by the following characters :

Head and thorax yellow, a dark spot between the ocelli and on each side of the occiput. Prothorax with four black points or streaks as in *Neuromus*. Meso- and metathorax with a black spot as in *sundaicus*. Abdomen black. Legs yellow, only the last 3-4 articulations of the tarsi brown. Antennae black.

Wings somewhat narrower and more elongated. The two dark points between media and radialsector are nearly invisible or absent. The dark spots of the forewings are very indistinct and less numerous than in *sundaicus*. Nervature the same, but the costalveins of the hindwings are yellow.

Body : 22mm; forewing : 25-28mm; hindwing : 22-24mm; ant. : 11mm; cost. forewing : 23-25mm;
abd. : 12mm; gr. br. : 9-11mm; gr. br. : 8 1/2-9 1/2mm; cost. hindwing : 21-23mm.

Habitat : Borneo.

I examined one female, the type, which remembers by the numerous small spots much my *punctato-guttatus*. It has been collected in Central Borneo, Mahakkam river, 1896, by Prof. Dr. A. W. Nieuwenhuis, and is in the Leyden Museum. Another smaller specimen, probably a ♂, of which the end of the abdomen and the antennae are broken off, is labelled : Borneo septentrional, Sandakan, Montano et Rey 1880. This latter specimen is in the Paris Museum.

[**Neochauliodes obscurus** Weele] (Planche IV, fig. 38).

Neochauliodes obscurus Weele, Notes Leyden Mus., XXX, p. 262 (1909).

A very aberrant and conspicuous species, pretty well characterized by the shining black colour of the body, legs, antennae etc., only the mouthparts are orange, except the tips of the mandibles which are black. Antennae serrate in the female.

Wings broadly oval, black, the humeri orange-red, those of the hindwings in a smaller extent than those of the forewings. Costal-area of forewings with some hyaline, whitish spots, which indicate that it must be occupied by very large, round, black spots; in the hindwings it is wholly deep black.

Pterostigma cream-white in both wings; distalwards from it one or two large hyaline spots in the apicalfield and a somewhat smaller spot between media and cubitus in the forewings. In the hindwings this spot reaches more proximalwards and surpasses the radialsector, nearly touching the radius. There are in the apicalfield of both wings traces of light streaks in the cells, and in the hindwings are such streaks between the lower cubitus and analveins. Nervature black, except in the light spots and in some spots of the apicalfield, where it is yellow.

Body : ♀ 28mm; forewing : ♀ 37mm; hindwing : ♀ 34mm; cost. forewing : 25mm;
abd. : ♀ 13mm; gr. br. : ♀ 14 1/2mm; gr. br. : ♀ 15mm; cost. hindwing : 25mm.

Habitat : India.

I examined a female labelled : Pressby, Dr. Watts, Manipur. Type in the British Museum. The generic position of this aberrant species seems to be somewhat doubtfull.

Genus **CTENOCHAULIODES** Weele (1909).

Weele, Notes Leyden Mus., XXX, p. 263 (1909).

Antennae pectinate in both sexes. Wings elongate, rather narrow, with rounded tips.

Habitat : Southern Asia.

Type : *Chauliodes nigrovenosus* Weele.

The unique species of this genus, the highest specialized of the group, is only known in the female sex. No doubt the ♂ also has pectinate antennae, but the characters of the genus can only completely be dressed up when both sexes are known.

[* **Ctenochauliodes nigrovenosus** (Weele)].

Chauliodes nigrovenosus Weele, Notes Leyden Mus., XXVIII, p. 257, taf. 5, fig. 1 ♀ (1907).

Antennae black, pectinate in the ♀. Head rufous brown, black between the ocelli. Mouthparts black. Thorax and abdomen black or blackish brown. Prothorax longer than broad, narrower than the head. Legs brown, the femora somewhat paler.

Wings elongate, narrow, with narrowed, acute tips. Membrane pale grey, nervature blackish brown, the crossveins broadly bordered with sepia-brown, so as to form irregular, blackish crossbands in the forewings and indistinct, dark dots in the apical part of the hindwings along the nervature. Tips of both wings dark.

Body : 21-27^{mm}; forewing : 29-32^{mm}; hindwing : 26-29^{mm}; ant. : 10-11^{mm};
abd. : 12-17^{mm}; gr. br. : 9-10^{mm}; gr. br. : 9 $^{1}/_{2}$-11 $^{1}/_{2}$^{mm};
cost. forewing : 29-30^{mm};
cost. hindwing : 23-24^{mm}.

Habitat : Tonkin and China.

The types, two ♀♀ collected by H. Fruhstorfer in the Mauson Mountains, 2-3000′, April to May, are in the Berlin Museum. I also examined a damaged specimen, without antennae and abdomen, probably a ♂ (judging from the relatively broader wings and head), labelled Kiang-Si, A. David 1875, from the Paris Museum.

Genus **NIGRONIA** Banks (1908).

Banks, Proc. Ent. Soc. Wash., pp. 29, 30 (1908).

This genus differs considerably from the other genera of this tribe by the dark colour of body and wings, which gives it a very different habitus.

The antennae of the ♂ are longly serrate to pectinate, those of the female are subserrate. The gonopoda of the ♂ are very aberrant from those of the other genera and they are highly specialized.

The appendices superiores are short, with remarkable dents at their innerside and the tuberculum is flat and placed laterally. The underside of the last segment has a large cavity in which the curious, long, simple penis is situated. The genitalvalve is very small.

Habitat : North America.

Only two species, *serricornis* and *fasciatus,* which are nearly related to one another, belong to this genus. The first named species is the most primitive one and accepted as the type.

Nigronia seems nearest related to *Neochauliodes*. The metamorphosis of the species is still unknown and differs probably from that of *Chauliodes,* but certainly it is less primitive than *Chauliodes*. Banks, however, utters an opposite opinion.

* **Nigronia serricornis** (Say).

Chauliodes serricornis Say, Long's Exped., II, p. 307 (1824). — Burmeister, Handb. Ent., II, p. 949 (1839). — Say, Amer. Ent. Ed. Le Conte, I, p. 206 (1859). — Hagen, Proc. Ent. Soc. Philad., II, p. 180 (1863). — Walsh, ibidem, p. 262 (1863). — Mac Lachlan, Ann. and Mag. Nat. Hist., (4) IV, p. 40 (1869). — Banks, Trans. Amer. Ent. Soc., XIX, p. 357 (1892). — Id., Ins. New Yersey, p. 52 (1900). — Needham, Bull. New York State Mus., 47, p. 549, pl. 27 (1901). — Davis, ibidem, 68, Ent. 18, p. 459, pl. 52, fig. 1 ♀ (1903). — Banks, Trans. Amer. Ent. Soc., 1907, p. 22 (1907).

Nigronia serricornis Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908).

= *Neuromus maculatus* Rambur, Hist. Ins. Névropt., p. 442, pl. 10, fig. 2 ♀ (1842).

Hermes maculatus Walker, Cat. Brit. Mus. Neur., p. 202 (1853). — Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 259 (1867).

Chauliodes maculatus Hagen, Syn. Neur. N. Amer., p. 191 (1861).

General colour black, the head and prothorax ornated with some narrow, longitudinal, reddish stripes, or reddish with ditto black stripes in the female, wholly black in the male. Antennae black and serrate in both sexes. Breast, legs and abdomen black. The legs somewhat paler in the female.

Fig. 52. — *Nigronia serricornis* (Say) ♂.
Gonopoda underside.
(Coll. Selys.)

Wings black, the costalveins in the basal half white (♀) or with white points at their bases (♂). In the middle of the forewing a row of 2-4 white cells, from there runs an irregular, white, transverse line, which is very variable in breadth, following the crossveins and stopping at the cubitus in both wings. There is also a black patch or point apicalwards from

the pterostigma and the crossveins of the apicalregion are all bordered with white; in the hindwings they are much larger and form quadrate, white patches, which are relatively larger in the males. All the described markings vary much individually and are often very indistinct.

The female is much more robust than the male, the head and body being about twice broader and the markings of the wings are also much more distinct. The genitalia of the male (fig. 52) consist of a pair of very short, obtuse and not prominent appendices superiores, which have at the tips a short straight cylindrical black stiletto, reaching in length about one half of the appendices superiores and articulated with them. They are strongly directed inwards, so that they are not visible from the lateral side and their obtuse tips do not reach one another. In the lower part, at the base of the appendices, is a chitinous process, so that it is furcated as in the following species. The penis is situated much more proximalwards and lays in a long oval excavation, of which the borders are darkbrown and chitinous. The membrane of the excavation is very thin. The penis itself is nearly as long as the excavation and is composed of a very thin chitinous membrane; in the middle the borders are broadly chitinized, gradually thickened towards the tips and curved ventro-medianwards, so as to form an imperfect canal. The tip has a slight excision in the middle and the chitinous part is there very broad. It gives the impression of being composed of two?-shaped chitinous parts.

The genitalvalve is very indistinct and only visible as a small nearly hyaline semicircular flap in chitine-preparations. It shows traces of a median suture and of an excision at the tip.

Body : ♂ 16-22^{mm}, ♀ 24-28^{mm}; forewing : ♂ 23-25^{mm}, ♀ 29-31^{mm}; hindwing : ♂ 21-23^{mm}, ♀ 26-28^{mm}; abd. : ♂ 8-14^{mm}, ♀ 11-14^{mm}; gr. br. : ♂ 8-9^{mm}, ♀ 9 $^{1}/_{2}$-10 $^{1}/_{2}$ ^{mm}; gr. br. : ♂ 7 $^{1}/_{2}$-8 $^{1}/_{2}$ ^{mm}, ♀ 9-10^{mm}; app. : ♂ $^{3}/_{4}$ ^{mm}.

ant. ♂ 13^{mm}; cost. forewing : ♂ 20-21^{mm}, ♀ 18-22^{mm};
ant. ♀ 10^{mm}; cost. hindwing : ♂ 19^{mm}, ♀ 17-20^{mm}.

Habitat : Eastern States of the United States.

In Selys' collection is a female, the type of Rambur, designed by Rambur in his handwriting « *Neuromus maculatus* Rambur » and by Hagen as « *Neuromus serricornis* Say* *maculatus* Rbr.* ». It bears a golden label but no indication of origin. There are moreover a ♂ and a ♀ indicated 1173 and 1175, received from Asa Fitch, two ♂♂ indicated Phil(adelphia?) from Latreille's collection and one ♂ with a label « United States, *Chauliodes serricornis* Say », written by Mac Lachlan.

[**Nigronia fasciatus** (Walker)] (Planche IV, fig. 34).

Chauliodes fasciatus Walker, Cat. Brit. Mus. Neur., p. 201 (1853).

= *Chauliodes serricornis* Hagen nec Say, Syn. Neur. N. Amer., p. 190 (1861).

= *Chauliodes lunatus* Hagen, Proc. Ent. Soc. Philad., II, p. 180 (1863). — Walsh, *l. c.*, p. 262 (1863). — Banks, Trans. Amer. Ent. Soc., 19, p. 357 (1892). — Id., Ins. New Yersey, p. 52 (1900).

Chauliodes fasciatus Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 259 (1867). — Id., Ann. and Mag. Nat. Hist., (4) IV, p. 40 (1869). — Davis, Bull. New York State Mus. 68, Ent. 18, p. 458 (1903). — Banks, Trans. Amer. Ent. Soc., p. 22 (1907).

Nigronia fasciatus Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908).

Nearly related and very similar to *serricornis*, but distinct from it by the following characters :

Antennae of the ♂ shortly pectinate, each tine very broad and nearly circular so that they seem to be pectinate on both sides when seen from above. In the female they are serrate. Head rufous, fuscous in the middle. Body brown, legs brown, the tibiae and tarsi fuscous.

Wings as in *serricornis,* but differing in the following points : forewings in the middle with a much broader white fascia, which is distally broader than proximally and contains a black spot in the middle of each cell. The corresponding fascia in the hindwings is also much broader, nearly as broad as that in the forewings, but more strongly curved. The spot of the pterostigma is much larger in both wings, and in the

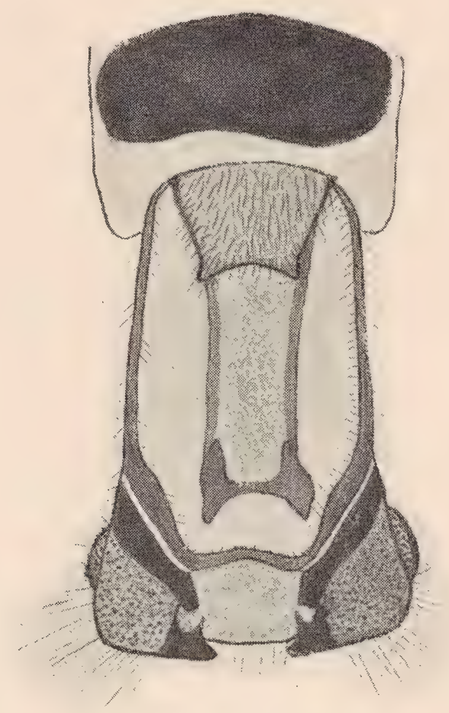

FIG. 53. — *Nigronia fasciatus* (Walker) ♂.
Gonopoda, underside.
(Coll. Navas.)

hindwings is a large, pale spot at the base along the distal border which is absent in *serricornis*. The apical white dots and lines are much smaller and less numerous.

The gonopoda of the ♂ (fig. 53) are formed in the same manner, but differ in the following points : appendices superiores shorter, curved at the tips, with a proximalwards directed dent. The lower branch is shorter and more obtuse. The tuberculum is inserted laterally. The excavation of the penis is nearly rectangular. The genitalvalve is nearly trapeziform. The penis is very long, nearly parallel-sided, the tip is not narrowed and ends in two hastate prominences, which are connected together at their bases and are prominent from the rest of the penis. In the figure this part has been tinted darker.

Body : ♂ 16mm; forewing : ♂ 24mm; hindwing : ♂ 22mm; ant. ♂ 10mm;
abd. : ♂ 8mm; gr. br. : ♂ 8 1/2 mm; gr. br. : ♂ 8 1/2 mm;
cost. forewing : 25mm;
cost. hindwing : 23mm.

Habitat : Eastern States of North America from New York to Mexico.

This species, which is rarer than *serricornis,* has been described by WALKER after two ♂♂ that were wrongly indicated from New Holland. MAC LACHLAN (1867) corrected this error and established first its synonymy. I examined a ♂ from Glen Echo, Md. 29 May 1899, from Prof. NAVAS' collection, as well as the types of WALKER.

SUBFAM. SIALIDINAE.

This small subfamily, which contains only two genera, is easily to be distinguished from the *Corydalinae* by the absence of the ocelli and by the bilobed fourth tarsal joint.

The larvae are characteristic by having only 7 pairs of distinctly jointed filaments and by the long pointed terminal segment which bears no anal legs. The eggs are always deposed in one layer and have a cylindric micropylar projection, which is twice longer than broad and united with the egg by a short neck.

The relation with the *Chauliodini* is evident, because there are no appendices superiores in the ♂ and the radialsector and radius are connected by three crossveins only.

By all these characters there is no doubt that they are the more specialized of both subfamilies.

The distribution is as follows : *Sialis* is holarctic, *Protosialis* is nearctic and chilian. The latter genus is more primitive, but nothing is known about the early stages and biology.

Genus **PROTOSIALIS** Weele (1909).

WEELE, Notes Leyden Mus., XXX, p. 263 (1909).

Body and wings much more slender. Colour of body black with orange.

Antennae of the male thickly pilose, hairless in the female.

Wings elongate and narrow, elliptical, with dark membrane and thin nervature, so that the nervature is not so distinct as in *Sialis*. The costal-area is not enlarged before the middle, but equally narrowed towards the pterostigma. The costalveins are obliquely directed towards the subcosta and not vertical as in *Sialis*. The radialsector has two branches : the first is once-forked, the second is simple and as long as the last simple end of the radius itself. In *Sialis* these two branches are always forked.

The gonopoda are formed after the same scheme as in *Sialis,* but so far as they are known, they are somewhat more primitive.

Habitat : North America, Mexico, Cuba and Chili.

Only four species, which were hitherto described as *Sialis*-species, are known. The development and biology is still unknown. They seem to be very rare, as they are seldom represented in collections. Probably they have an other mode of life as *Sialis*.

Type of the genus is *Protosialis americana* RAMBUR.

* **Protosialis americana** (Rambur).

Semblis americana Rambur, Hist. Nat. Ins. Névropt., p. 447 (1842).

= *Sialis ferrugineus* Walker, Cat. Brit. Mus. Neur., p. 195 (1853). — Mac Lachlan, Journ. Linn. Soc. Zool., IX, p. 259 (1867).

Sialis americana Hagen, Syn. N. Amer. Neur., p. 188 (1861). — Banks, Trans. Amer. Ent. Soc., XIX, p. 357 (1892). — Id., *l. c.*, p. 22 (1907). — Id., Ins. New Yersey, p. 52 (1900). — Hine, Ohio Natural., II, p. 190 (1902). — Davis, Bull. New York State Mus. 68, Ent. 18, p. 450 (1903). — Banks, *l. c.*, 34, p. 22 (1907).

Body black, yellow beneath; head above black, with numerous yellow parallel streaks on the occiput; the labrum and the front between the black eyes, yellow. Anterior angles of the prothorax square. Legs fuscous, the femora ferrugineous. Antennae black, pubescent in the male.

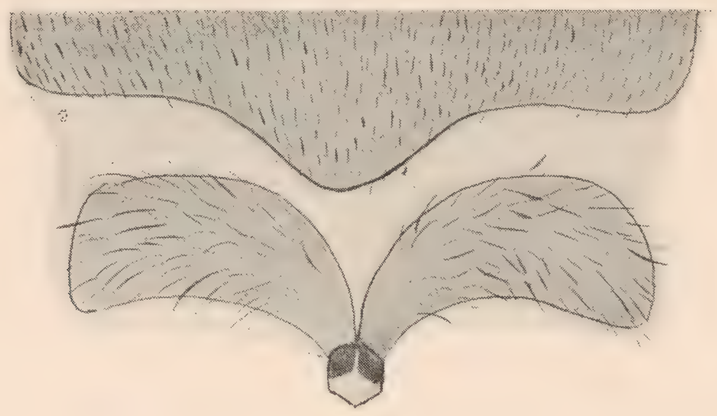

Fig. 54. — *Protosialis americana* (Rambur) ♀.
Gonopoda, underside 7th and 8th segments.
(Leyden Museum.)

Wings elongate, ferrugineous to smoky brown, with darkbrown nervature, that however is less conspicuous and not thickened.

The genitalia of the female (fig. 54) have a broad 8th sternit, consisting of two curved pieces joined in the middle by a hexagonal plate. The 7th sternit has a broad prominent lobe in the middle.

Body : 11mm; forewing : 14mm; hindwing : 12mm;
abd. : 6mm; gr. br. : 4 1/2 mm; gr. br. : 4mm.

Habitat : South Eastern States of the United States, viz. : Georgia, Pennsylvania and Ohio.

This species is either not common or often confounded with *S. infumata* Newman, because it is but rarely mentioned. Nothing is known about its development and biology. The female only is known to me. Walker describes the male as having the black antennae very pubescent. In the collection Selys is Rambur's type, an immature female labelled in the author's handwriting : « Coll. Latreille, *Semblis americanus* Rambur », and moreover provided with another label : « *S. americana* Rambur * » written by Dr. H. A. Hagen. I examined another specimen, a ♀ in the Leyden Museum, that is erroneously labelled « Latreille Senegal » and that I mentioned in Notes Leyden Mus., XXVI, p. 222 (1905).

Protosialis mexicana (Banks) (Textfig. 56).

Sialis mexicana Banks, Trans. Amer. Ent. Soc., XXVII, p. 363 (1901).

Nearly related to *americana* and of the same size, but the head wholly orange-yellow, except at each side behind the black eyes, where it is black.

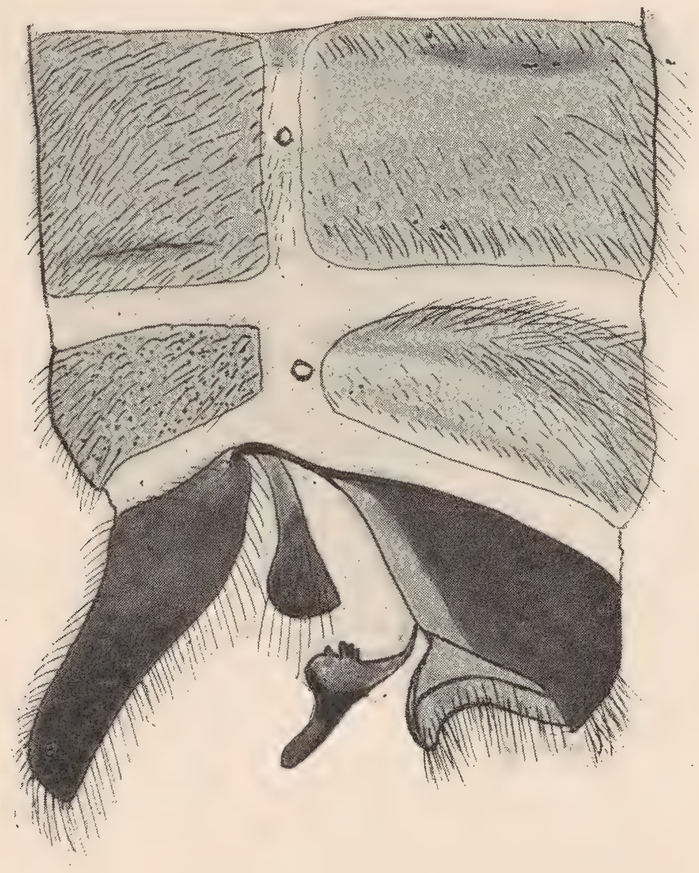

Fig. 55. — *Protosialis mexicana* (Banks) ♂.
Gonopoda, lateral view.
(Coll. Selys.)

Pronotum orange like the head. Antennae black, thickly covered with black hairs, the 5 basal joints yellow, with yellow hairs.

Fig. 56. — *Protosialis mexicana* (Banks) ♂ (type).
(Coll. Banks.)

Thorax and legs black. Wings as in *americana*. Abdomen black. The genitalia of the ♂ (fig. 55) show the following characters : appendices superiores short and curved upwards at the tip. The tooth is of a complicate form. The genitalvalve is large and very long. The penis (?) is clubshaped.

Habitat : Mexico.

The type, a ♂ of which I saw a photograph, is from Jalapa, Vera-Cruz, August. I examined one ♂ from Mexico in the collection Selys.

[**Protosialis bifasciata** (Hagen)].

Sialis bifasciata Hagen, Syn. N. Amer. Neur., p. 188 (1861). — Davis, Bull. New York State Mus. 68, Ent. 18, p. 451 (1903).

I have seen neither specimens nor photographs of this species. Judging from the description it is related to *americana* and *mexicana* and characterized by the following characters :

Antennae black, stout, pilose. Head not narrowed posteriorly, orange-coloured, with two black stripes; the occiput orange, with flat streaks and spots which are somewhat shining. Prothorax with obtuse anterior angles, orange, each side with a broad fuscous stripe and flat points. Feet fuscous, femora yellowish with the base fuscous. Wings pale fuscous, somewhat shining, anterior ones more obscure upon the costal margin, veins pale fuscous. Genitalia unknown.

Alar-expanse 17-20^{mm}.

Habitat : Cuba (Poey).

Judging from the description this species seems to be intermediate between *americana* and *mexicana*.

[**Protosialis chilensis** (Mac Lachlan)] (Planche IV, fig. 35).

Sialis chilensis Mac Lachlan, Ent. monthl. Mag., VII, p. 145 (1870). — Davis, Bull. New York State Mus. 68, Ent. 18, p. 451 (1903).

Antennae and palpi black. Head reddish; an impressed median longitudinal line reaching the hind margin, joining a sinuate line in front before the antennae; frontal part and at sides of median line suffused with fuscous; a fuscous spot on each side below the eyes; labrum testaceous, truncated in front; eyes larger and much more prominent than in other species. Thorax blackish fuscous, very narrow, clothed with short pubescence; legs and feet blackish fuscous, short pubescent; claws and beneath lobes of fourth tarsal joint testaceous. Wings smoky, somewhat shining, membrane with short, black hairs; pale space in each wing below the juncture of radius with subcosta; veins black, costal-area narrow, slightly dilated, with about seven crossveins. $Radius_3$ with but one forked branch; front wings long and narrow, apex long elliptic; hindpair slightly broader. Genitalia unknown.

Habitat : Chili.

I saw a photograph of Mac Lachlan's type, which is probably a female, because the antennae are not hairy. It mostly remembers *americana* and has the same size.

Genus **SIALIS** Latreille (1803).

Latreille, Hist. Nat. Crust. Ins., III, p. 290 (1803). — Id., *l. c.*, XIII, p. 44 (1804).
Burmeister, Handb. Entom., II, p. 945 (1839).
Brauer and Löw, Neuropt. austriaca, p. 53 (1857).
Hagen, Syn. N. Amer. Neur., p. 187 (1861).
Pictet, Névropt. d'Espagne, p. 51 (1865).
Mac Lachlan, Monogr. Brit. Planip., p. 152 (1868).
Girard, Traité d'Entom., II, p. 520 (1876).
Schoch and Ris, Neuropt. helvetiae (1885).
Rostock, Neur. germ., p. 112 (1888).
Weele, Notes Leyden Mus., XXVI, p. 209 (1905).
Davis, Bull. New York State Mus. 68, Ent. 18, p. 443 (1903).
Banks, Proc. Ent. Soc. Wash., X, p. 30 (1908).
= *Semblis* Rambur nec Fabricius, Hist. Nat. Ins. Névropt., p. 446 (1842).

Antennae simple, moniliform in both sexes. Body stouter, black, only some luteous streaks on the occiput.

Wings broader and shorter than in *Protosialis,* paler brown with thick, elevated and very distinct nervature. The two apical branches of the radialsector always forked in both wings.

Costal-area suddenly dilated before the middle, the costalveins are directed vertically on the subcosta.

Subcosta and radius strongly divergent in the middle, in *Protosialis* nearly parallel.

Gonopoda somewhat more complicated.

Habitat : Holarcticum incl. Japan.

The development and biology of most of the species is known. It is the best known genus of the whole family and has the largest geographical distribution.

The species belong to the most common Neuropterous insects. They are much more similar to one another than in *Protosialis* and are nearly only distinguishable from one another by the gonopoda.

Type of the genus is *Sialis lutaria* (L.).

* **Sialis lutaria** (Linné).

Rösel, Insektenbelust., II (2), tab. 13 (1749).

Hemerobius lutarius Linné, Syst. Nat., edit. X., p. 550 (1758); Faun. Suec., edit. II, p. 384 (1763); Syst. Nat., edit. XII, p. 913 (1767). — Müller, Faun. Friedr., p. 65 (1764); Prodr., p. 146 (1770). — Olivier, Enc. Méth., VII, p. 62 (1762).

Semblis lutarius Fabricius, Syst. Entom., p. 305 (1775); Spec. Insect., p. 387 (1781); Mant. Ins., p. 244 (1787); Entom. Syst., p. 74 (1793). — Zetterstedt, Ins. Lapp., p. 1051 (1840). — Rambur, Hist. Nat. Ins. Névropt., p. 447 (1842).

Sialis lutarius (a) Latreille, Hist. Nat. III, p. 291 (1803). — Stephens, Ill., p. 134 (1836). — Pictet, Ann. sc. nat., V, pl. III, fig. 1-4 (1836). — Burmeister, Handb. Ent., II, p. 947 (1839). — Imhoff and Labram, Ins. d. Schweiz, V, p. 447 (1845). — Brauer, Verh. zool. bot. Ges. Wien, VI, p. 397 (1856). — Brauer and Löw, Neur. austr., p. 53 (1857). — Hagen, Brit. Planip., p. 30 (1858). — Wallengren, Oefvers. Akad. Förh. 1863, p. 16; Skand. Neur. Planip., p. 58 (1871). — E. Pictet, Névropt. d'Espagne, p. 51 (1865). — Mac Lachlan, Mon. of Brit. Planip., p. 152, pl. VIII, fig. 1 (1868). — Meyer-Dür, Neur. d. Schweiz, p. 355 (1875). — Girard, Traité d'entom., II, p. 521 (1876). — Rostock, Neur. germ., p. 112 (1888). — Miall, Nat. Hist. Aquat. Ins., chap. VI (1895).

= *Sialis niger* Latreille, Hist. Nat., XIII, p. 44 (1804); Gen. Ins., III, p. 200 (1807).

= *Sialis flavilatera* Kolbe, Stett. Ent. Zeit., XLI, p. 351 (1880).

This common european species is one of the best known insects, so that an enumeration of the principal characters will be sufficient to distinguish it from the other species.

Body black. The head with some shining luteous markings on the occiput and behind the eyes. The median and largest of them, which reach from the hindborder of the occiput to the middle, are parallel, of equal breadth at base and tip and neither divergent nor enlarged there.

Wings hyaline to light smoky, with brown or blackish brown nervature, the costa is luteous only at its base.

The genitalia of the ♂ (fig. 57), as seen in a preparation of the chitinous parts, show a pair of digitiform appendices superiores, which bear at the underside a short triangular clasp,

which has often a long membranous appendix at the side. The genitalvalve is broad and large when seen sideways; it is articulated with a soft chitinous organ that is mammiform and probably represents the penis.

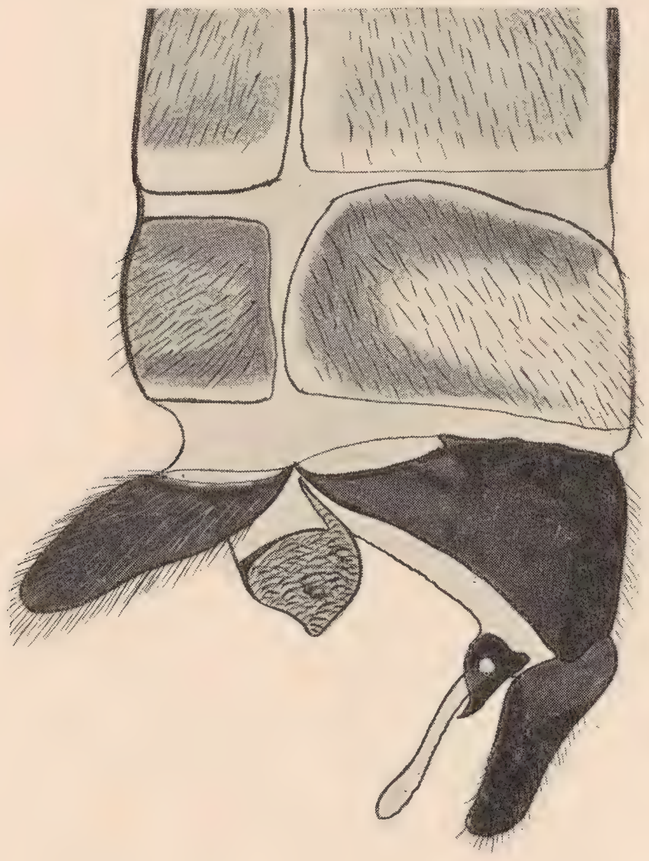

FIG. 57. — *Sialis lutaria* (L.) ♂.
Gonopoda, lateral view.
(Coll. Selys.)

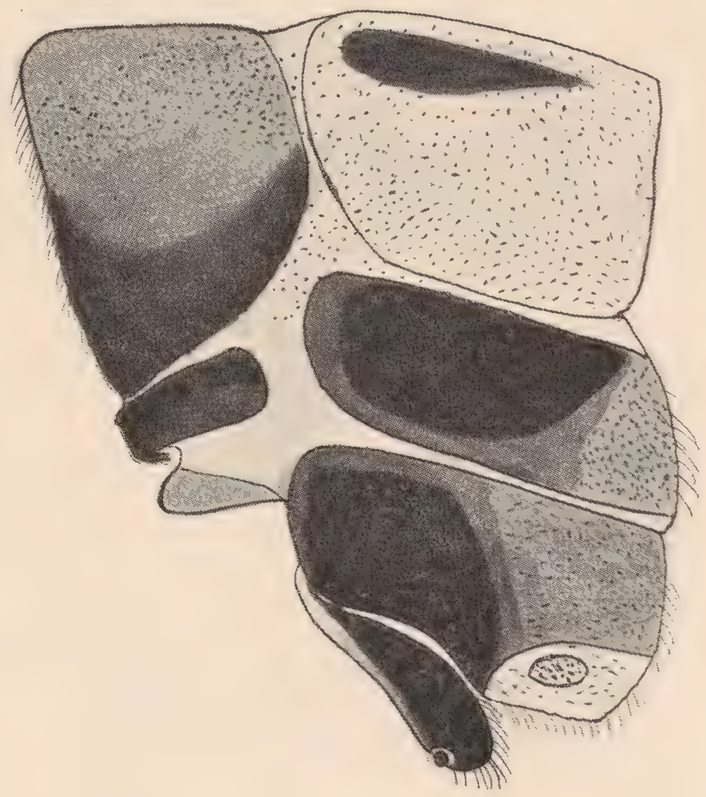

FIG. 58. — *Sialis lutaria* (L) ♀.
Gonopoda, lateral view.
(Coll. Selys.)

The female (fig. 58) has very short appendices superiores, which are of a very soft, membranous chitine, and the 9th segment bears two gonopoda, which are clubshaped as in the other genera. The 8th sternit is dark, strongly chitinized and narrow when seen from below

FIG. 59. — *Sialis lutaria* (L.) ♀.
7th and 8th sternits.
(Coll. Selys.)

(fig. 59); it has in the middle a cordiform thickened space, that is directed upwards. The 7th sternit has a peculiar incision in the middle of the hindborder.

Habitat : Europe.

A very common species at currents or stagnant waters in spring. Its biology and metamorphosis are often described.

In the collection SELYS are very extensive series. The specimens out of Belgium are from : RAMBUR's coll. 5 specimens, Gomergrat-see 2 specimens and 1 from Holland.

In the belgian collection are specimens from : Ixelles, 22.5.1879; Martin-Rive, 30.5.1881; Angleur, 12.5.1881; Rouge-Cloître, 15.5.1881; St-Gilles and Fallais, 23.6.1879, collected by H. DONCKIER and 22 specimens from Lanaken, May and June.

Sialis fuliginosa Pictet.

Sialis fuliginosus Pictet, Ann. sc. nat. (2) Zool., V, p. 79, tab. III, figs. 5-6 (1836).

Sialis fuliginosa Burmeister, Handb. Entom., II, p. 947 (1839). — Brauer, Verh. zool. bot. Ges. Wien, VI, p. 397 (1856). — Brauer and Löw, Neur. austr., p. 52 (1857). — Mac Lachlan, Mon. Brit. Planip., p. 152, tab. VIII, fig. 2 (1868). — Wallengren, Oefvers. Akad. Förh., 1870, p. 152 (1871); Skand. Neur. Planip., p. 59 (1871). — Meyer-Dür, Neur. d. Schweiz, p. 353 (1875). — Girard, Traité d'Entom., II, p. 521 (1876). — Rostock, Neur. germ., p. 113 (1888). — Schoch and Ris, Neuropt. helvetiae (1885). — Davis, Bull. New York State Mus., 68, Ent. 18, p. 449 (1903). — Banks, Trans. Amer. Ent. Soc., p. 22 (1907).

During a long time this species has been confounded with *lutaria*. It is of the same size but easily distinguished from it by the following characters :

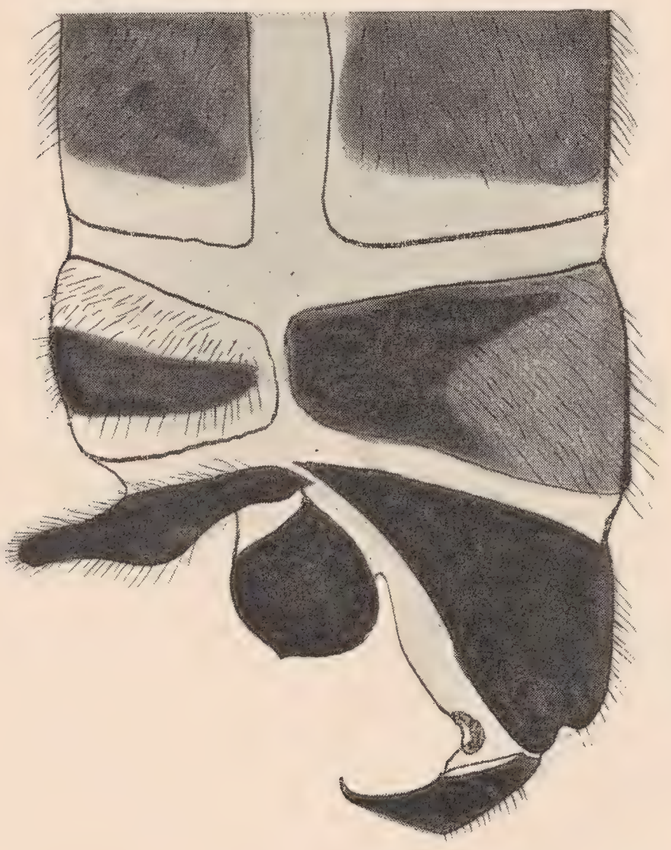

Fig. 60. — *Sialis fuliginosa* Pictet ♂.
Gonopoda, lateral view.
(Coll. Selys.)

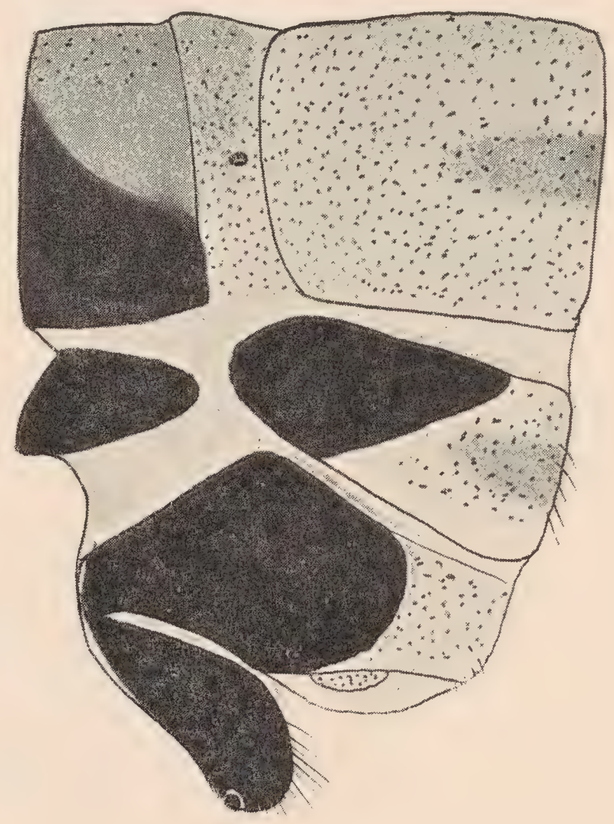

Fig. 61. — *Sialis fuliginosa* Pictet ♀.
Gonopoda, lateral view.
(Coll. Selys.)

The general colour of the wings almost always darker, more smoky brown. The median

Fig. 62. — *Sialis fuliginosa* Pictet ♀.
7th and 8th sternits.
(Coll. Selys.)

luteous markings of the occiput are somewhat enlarged at the apex and elongate-cordiform. The costa is always dark at the base, even in immature or pale coloured individuals.

As, however, some other species have the same characters as mentioned above, the genitalia only offer the most certain characters.

The ♂ (fig. 60) has a pair of clasp-shaped appendices superiores. The clasp below it however is only indicated as a chitinous halfring. The genitalvalve is shorter and narrower when seen sideways; it has a dilatation in the middle. The penis is somewhat broader than in *lutaria* but of a similar form.

The ♀ (fig. 61) has somewhat broader gonopoda as in *lutaria*. The 8th sternit (fig. 62) is remarkable, consisting of two separate corneous chitinous pieces. The hindborder of the 7th sternit is integral.

Habitat : Europe, Asia minor.

Much rarer than *lutaria* and probably preferring current water for its development. The metamorphosis is described by PICTET (1836). The geographical distribution seems to be larger than that of *lutaria,* as I examined in the collection SELYS a female-specimen from Anatolia. In the same collection are specimens from RAMBUR's collection, named by that author *S. lutaria,* as well as a series from various localities in Belgium and Europe.

The record of the occurrence of this species in North America will be based upon an incorrect determination of dark-coloured specimens of *infumata* NEWMAN.

The european specimens in the collection SELYS are from Dalmatia and the Alpes. In the belgian collection there are specimens from : Moresnet 18.6; Arlon 1.6; Waudemont, May; Lanaken 16.5 and Haren, May and June.

Sialis nigripes Pictet.

Sialis nigripes PICTET, Névropt. d'Espagne, p. 52, tab. IV, figs. 1-5 (1865). — HAGEN, Stett. Ent. Zeit., XXVII, p. 287 (1866). — MAC LACHLAN, Ent. monthl. Mag., XVII, p. 62 (1880). — NAVÁS, Rev. real Acad. cienc. exact. etc. Madrid, II, nº 4, p. 37 (1905).

FIG. 63. — *Sialis nigripes* Pictet ♂.
Gonopoda, lateral view.
(Leyden Museum.)

Nearly related to *fuliginosa* but distinguished by its small size, having merely about

$^1/_2$-$^2/_3$ of the wing-expanse of normal individuals of that species. The markings of the head, colour of wings etc. are the same as in *fuliginosa,* and I do not know any constant difference between both forms except in the genitalia, so that I was at first inclined to accept MAC LACHLAN's opinion (1880), that *nigripes* was based upon small *fuliginosa*-individuals.

There is however an important difference between both species in the genitalia (fig. 63). They appear, in regard to this character, rather related to *lutaria*. In the ♂ the appendices superiores are less strong, but also digitiform, the tooth below it is much longer than in *lutaria* and nearly as long as the appendix. The genitalvalve is much shorter and recalls in mind that of *fuliginosa*. The lobes of the penis are very different, as they are broadly connected with the sides of the ultimate tergit; the tip is serrate.

In the female (fig. 64) the resemblance with *lutaria* is also evident. The hindborder of the 7th sternit has two broad, obtusely angulated incisions at the sides. The 8th sternit is narrow;

FIG. 64. — *Sialis nigripes* Pictet ♀.
7th and 8th sternits.
(Leyden Museum.)

it is solid as in *lutaria* and has in the middle two pentagonal chitinous condensations, which bear a rhomboid, hyaline, distal process.

Habitat : Spain.

I have not seen PICTET's types, which were collected in July at San Ildefonso in Old Castilia, but I examined specimens from the same locality in ALBARDA's collection. In the collection SELYS are one ♂ from Barcelona, RAMBUR, and two ditto from Catalonia, collected by CUNY. I rather doubt if the indications received from NAVÁS about the occurrence of *fuliginosa* in Spain are correct. Most probably this species is substituted there by *nigripes*.

Sialis sibirica Mac Lachlan.

Sialis sibirica MAC LACHLAN, Ann. Soc. Ent. Belg., XV, p. 55, taf. I, fig. 10 (1872). — DAVIS, Bull. New York State Mus. 68, Ent. 18, p. 452 (1903).

This species is in all its characters, size included, similar to *fuliginosa,* the colour of the wings only seems to be somewhat darker smoky brown. The specific difference is however very clear in the genitalia of both sexes.

The ♂ (fig. 65) has a pair of narrow long appendices superiores, which are slightly curved upwards. They bear at their underside in the soft membrane a slightly curved, brown spine.

The genitalvalve is small, in the form of a chitinous band, but there are two very large, trian-

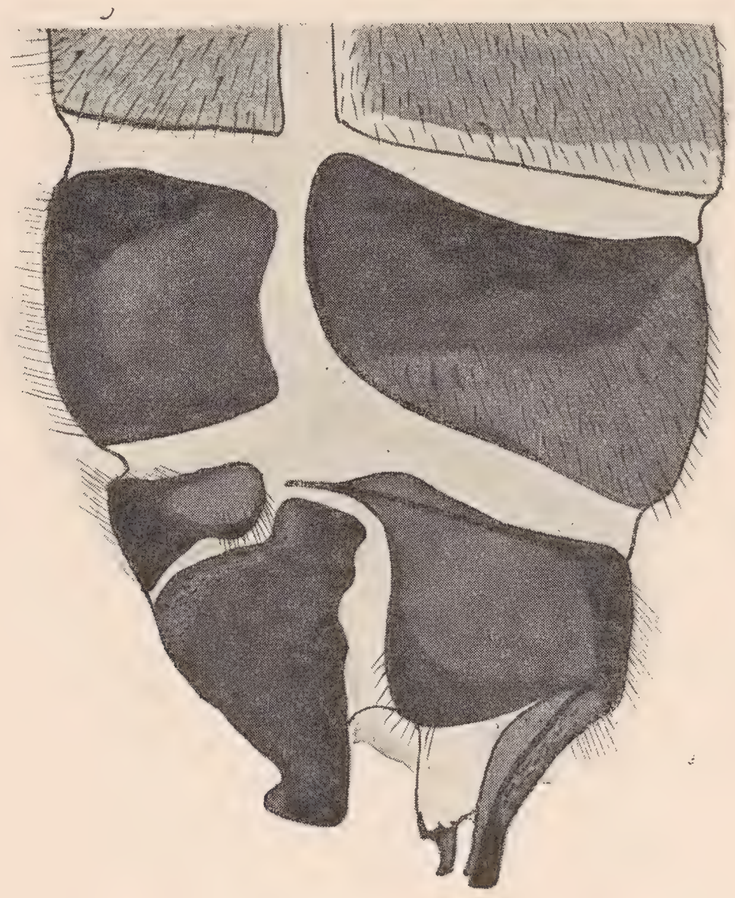

FIG. 65. — *Sialis sibirica* Mac Lachlan ♂.
Gonopoda, lateral view.
(Coll. Selys.)

gular, chitinous lobes, which articulate with the genitalvalve and which probably represent the penis.

In the female (fig. 66) the 8th sternit is a narrow, brownish chitinous plate with two

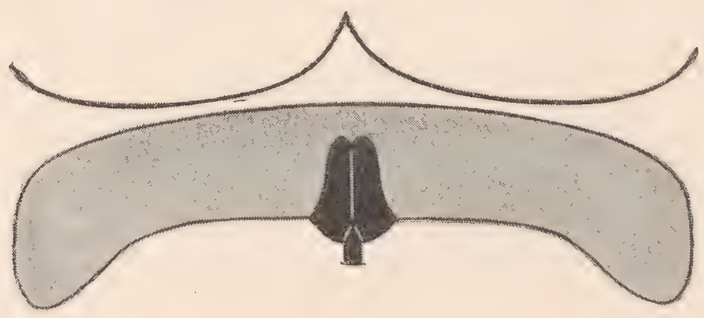

FIG. 66. — *Sialis sibirica* Mac Lachlan ♀.
7th and 8th sternits.
(Coll. Selys.)

characteristic condensations in the middle, that bear a t-shaped process at their tip. The 7th sternit has a deep excision in its hindborder.

Habitat : Sibiria.

MAC LACHLAN mentions no special localities for his types. His figures are rather schematic.

In the collection SELYS is a series of eleven specimens, five of which are labelled with the name by MAC LACHLAN himself. Six specimens are from Irkutsk, three from the Amur and two from Pokrofka, Amur, 9 and 12 June.

Sialis japonica Weele.

Sialis spec. Mac Lachlan, Ent. monthl. Mag., VII, p. 146 (1870). — Id., Trans. Ent. Soc. London, 1875, p. 174 (1875).
Sialis japonica Weele, Notes Leyden Mus., XXX, p. 264 (1909).

This form also belongs to the nearest relatives of *fuliginosa* in its external characters, size etc.

The costa is black at the base, the two markings on the occiput are somewhat divergent and the wings are more or less dark smoky brown. The genitalia however are very different and as the female only is known, there is an interesting resemblance with *infumata* Newman from North America, the hindborder of the 7th sternit bearing a small semicircular excision in the

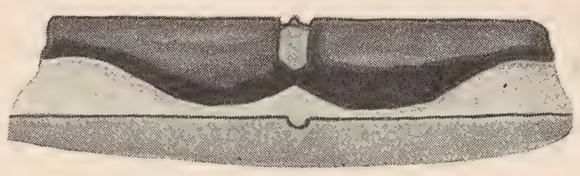

Fig. 67. — *Sialis japonica* Weele ♀.
7th and 8th sternits.
(Coll. Selys.)

middle. The 8th sternit (fig. 67) is a solid piece with straight hindborder and broadly bilobated frontborder. The first bears in the middle a hyaline hexagonal piece, which has a small distal knob.

Habitat : Japan.

This is the species, mentioned by Mac Lachlan from Japan and not described by him by want of males. The difference is however clear enough in the female-genitalia, when a preparation is made of them. I examined a female, labelled « Japan, n° 15 », in the collection Selys, and two females, labelled « Japon, Nippon moyen, environs de Tokio, J. Harmand 1906 », are in the Paris and Leyden Museum.

Sialis infumata Newman (Textfig. 70).

Sialis infumata Newman, Ent. Mag., V, p. 500 (1838). — Walker, Cat. Brit. Mus. Neur., p. 195 (1853). — Hagen, Syn. N. Amer. Neur., p. 188 (1861). — Id., Proc. Ent. Soc. Philad., II, p. 181 (1863). — Walsh, Proc. Ent. Soc. Philad., II, p. 261 (1863). — Banks, Trans. Amer. Ent. Soc., XIX, p. 357 (1892). — Id., Ins. New Yersey, p. 52 (1900). — Needham, Bull. New York State Mus., 47, p. 542, pl. 29 (1901). — Davis, *l. c.* 68, Ent. 18, p. 448 (1903). — Banks, Trans. Amer. Ent. Soc., p. 22 (1907).

Though generally smaller, this species remembers mostly *fuliginosa* in the form of the wings, markings of the head and dark costa.

The wings are not very dark-coloured, about as in *lutaria,* but the basal half or third is strongly suffused with smoky brown.

The genitalia of the ♂ (fig. 68) are characterized by very short dent-like appendices superiores, which are hidden behind the broad bottle-shaped lobes. The genitalvalve is short,

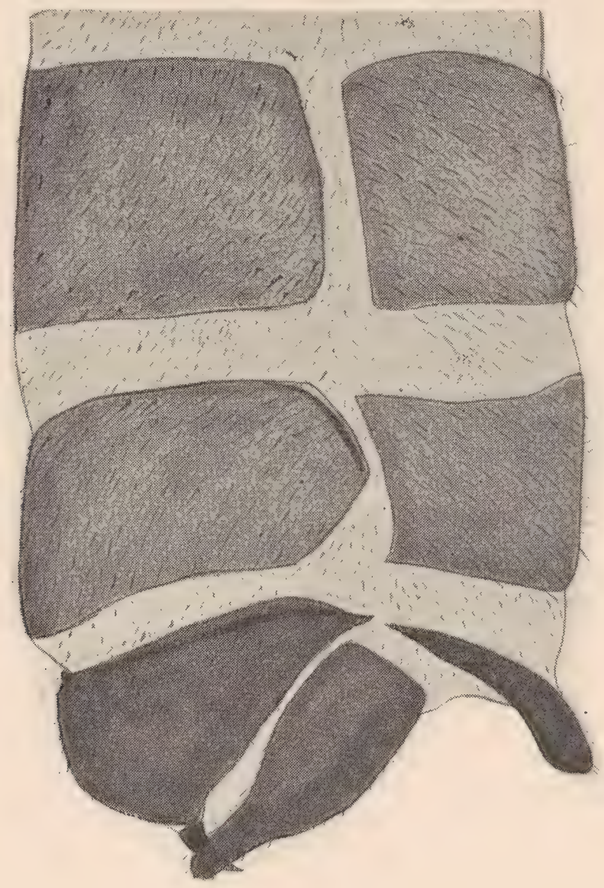

FIG. 68. — *Sialis infumata* Newman ♂.
Gonopoda, lateral view.
(Coll. Selys.)

but very broad when seen from below. Those of the female are formed after the same plan as in the palaearctic species. The 8th sternit (fig. 69) remembers most that of *japonica;* it is elongate

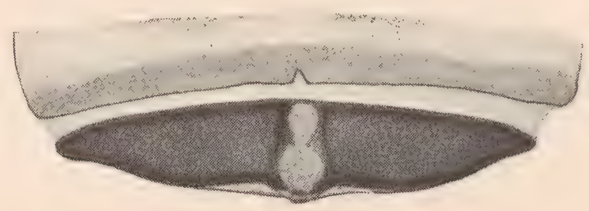

FIG. 69. — *Sialis infumata* Newman ♀.
7th and 8th sternits.
(Leyden Museum.)

rhomboid, with a characteristic hyaline spot in the middle. The hindborder of the 7th sternit bears a triangular incision in the middle.

Habitat : United States of America and Canada.

This form occurs in the Western and Eastern parts of the United States and seems to be common. In the collection SELYS are two specimens from Québec, PROVANCHER, which were placed among *fuliginosa*-specimens.

The development and biology are described by NEEDHAM (1901) and by DAVIS (1903).

I presume that the following species are synonyms of *infumata,* because after photographs of the types they do not differ from it, and because they are recorded from the same localities as *infumata*. I regard them, according to the indicated differences, as individual variations, but without being acquainted with the genitalia, no certainty is to be acquired.

[*Sialis concava* Banks], Trans. Amer. Ent. Soc., 24, p. 22 (1897). — Id., *l. c.*, 34, p. 22 (1907). — Davis, Bull. New York State Mus. 68, Ent. 18, p. 449 (1903).

Individuals from New York, in which the occiput is somewhat concave by conservation, are the types of Bank's species. I saw a photograph of his types, but I believe, as Davis, this form to be synonymous with *infumata*.

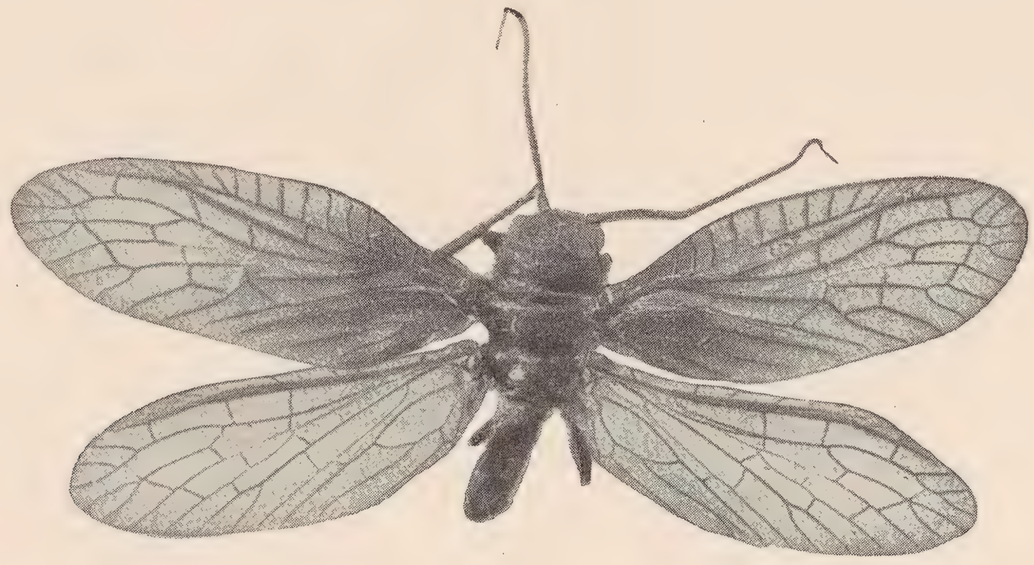

Fig. 70. — *Sialis infumata* Newman.
Type of *S. concava* Banks.
(Coll. Banks.)

[*Sialis fuliginosa* Davis] nec Pictet? *loc. cit.*, p. 449 (1903). — Banks, Trans. Amer. Ent. Soc., 34, p. 22 (1907).

As it is almost impossible that this european species occurs likewise in Western North America and judging from the description of Davis, I have all reason to suppose that he had before him dark-coloured specimens of *infumata*. His types are from California.

[*Sialis nevadensis* Davis], *loc. cit.*, p. 450 (1903). — Banks, *loc. cit.*, p. 22 (1907).

A photograph of the type shows no differences with *infumata*. The types are from California.

[*Sialis Morrisoni* Davis], *loc. cit.*, p. 450 (1903). — Banks, *loc. cit.*, p. 22 (1907).

The type is, judging from a photograph, only a darker coloured specimen of *infumata*. It originates from California.

Fam. RAPHIDIDAE.

These curious insects, which are hitherto only known to be holarctic, have been thoroughly studied by the late Mr. H. W. Albarda, see « Tijdschrift voor Entomologie, 34 (1891) ». I therefore give only an enumeration of the species of the collection Selys that are all studied by him in behalf of his Monography, separating in my list the belgian species from the general collection.

GENERAL COLLECTION.

Genus **RAPHIDIA** Linné (1735).

1. *R. notata* Fabricius, Spec. Ins., I, p. 402, n° 1 (1781). — Albarda, Tijdschr. Entom., 34, p. 91, pl. 2, fig. 2 (1891).

Six specimens, of which four are from Latreille's collection, two of which being types of *R. media* Schneider, and two others from Rambur's collection : one from Chamounix, the other labelled by Rambur « *R. ophiopsis* L. ».

2. *R. major* Burmeister, Handb. Entom., II, p. 964, n° 4 (1839). — Albarda, *loc. cit.*, p. 95, pl. 3, fig. 3 (1891).

Five specimens, among which one, named *notata* F., from Latreille's and Serville's collection, two others from Latreille's collection, and a couple from Serville's collection, the ♂ labelled by Rambur « *R. ophiopsis* L. ».

3. *R. ophiopsis* Linné, Syst. Nat., edit. X, I, p. 552 (1758). — Albarda, *loc. cit.*, p. 104, pl. 4, fig. 7 (1891).

Five specimens : one ♀ from Latreille's collection, one ♂ from Rambur's collection, labelled by that author « *R. ophiopsis* Geer » and being the specimen after which he has drawn up his description; moreover one couple from Croatia and one ♀ received from Deyrolle.

4. *R. flavipes* Stein, Berlin. Entom. Zeits., VII, p. 416 (1863). — Albarda, *loc. cit.*, p. 110, pl. 4, fig. 9 (1891).

Seven specimens : one ♂, three ♀♀ and three incomplete specimens, one of the latter from Latreille's collection, the others from Croatia and labelled « *baetica* Rambur » and « *affinis* Schneider ».

5. *R. insularis* Albarda, *loc. cit.*, p. 117, pl. 5, fig. 12 (1891).

Nine type-specimens : one ♀ from Rambur's collection, seven ♀♀ from Corsica and one ♀ from Sicily, collected by Bellier de la Chavignerie. According to Albarda they were named as *cognata* Rambur.

6. *R. maculicollis* Stephens, Ill. of Brit. Entom. Mandib., VI, p. 131 (1836). — Albarda, *loc. cit.*, p. 124, pl. 6, fig. 15 (1891).

Two specimens : the incomplete types of *R. hispanica* Rambur, Hist. Névr., p. 438 (1842). A ♀ from the Netherlands, North Brabant, Galderen 10.VI, from Mr. H. W. Albarda is in the belgian collection.

7. *R. baetica* Rambur, *loc. cit.*, p. 437 (1842). — Albarda, *loc. cit.*, p. 127, pl. 6, fig. 16 (1891).

One specimen : Rambur's type, labelled by himself *R. baetica* Rambur.

8. *R. xanthostigma* Schummel, Versuch, p. 12, fig. 2, *a* et *b* (1832). - Albarda, *loc. cit.*, p. 130, pl. 7, fig. 17 (1891).

Two specimens : one ♀ from Latreille's collection and one incomplete ♂ labelled « Paris » from Serville's collection. A ♂ from the Netherlands, Gelderland, Arnhem 8.V, van Medenbach de Rooy, presented by Mr. H. W. Albarda is in the belgian collection.

9. *R. cognata* Rambur, *loc. cit.*, p. 438 (1842). — Albarda, *loc. cit.*, p. 135, pl. 7, fig. 19 (1891).

Eighteen specimens : one small ♂, type, labelled « *R. cognata* Rambur », from Rambur himself and two ♂♂ and two ♀♀ from Rambur's collection ; two ♂♂ from Serville's collection, and one ♂ and ten ♀♀ from Latreille's collection, one of them is labelled « Paris ».

10. *R. oblita* Hagen, Syn. Neur. N. Amer., p. 195 (1861). — Albarda, *loc. cit.*, p. 149, pl. 9, fig. 25 (1891).

Two female-specimens : one labelled « California, Edwards », the other labelled « California ». Both labels are in Mac Lachlan's handwriting and the specimens probably received from him.

Genus **INOCELLIA** Schneider (1843).

11. *I. crassicornis* Schummel, Versuch, p. 15, fig. *a, b, c* (1832). — Albarda, *loc. cit.*, p. 160, pl. 10, fig. 28 (1891).

Two specimens : one ♀ from Irkutsk and another from Chabarofka 6.VI.

BELGIAN COLLECTION.

Genus **RAPHIDIA** Linné.

R. notata Fabricus.

Six specimens : one ♀ from Mariemont, one ♂ from the Forêt de Meerdael 23.V.1870, one ♀ from Halloy, one ♂ from Angleur, two ♂♂ from Rixensart 10.6.1872, G. Severin.

R. major Burmeister.

Two specimens : one ♂ from Neufchateau, one incomplete specimen from Halloy.

R. ophiopsis Linné.

One incomplete specimen from Virton.

R. cognata Rambur.

Six specimens : one ♀ from Longchamps 5 juillet, one ♂ from Angleur, one ♂ from Orval, one ♀ from Cointe 1.7.1889 and two specimens without indication of locality.

SYSTEMATIC LIST

(The name of the species not represented in Selys' Collection are placed between [ ].
The asterisk indicates that the Type is in this collection).

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Fig. 1.
(Coll. Mac Lachlan)

Fig. 2.
(Mus. Leiden)

Fig. 3.
(Mus. Halle)

Fig. 4.
(Mus. Cambridge)

Fig. 5.
(Coll. Selys)

Fig. 6.
(Coll. Selys)

Fig. 7.
(Mus. Leiden)

Fig. 8.
(Mus. Leiden)

Fig. 1. *Corydalus Batesi* MAC LACHLAN
Fig. 2. *Corydalus primitivus* WEELE
Fig. 3. *Corydalus affinis* BURMEISTER
Fig. 4. *Corydalus armatus* HAGEN
Fig. 5. *Chloronia corripiens* WALKER
Fig. 6. *Chloronia hieroglyphicus* RAMBUR
Fig. 7. *Chloronia meridionalis* WEELE
Fig. 8. *Corydalus nubilus* ERICHSON

Fig. 9.
(Mus. Paris)

Fig. 10.
(Mus. Leiden)

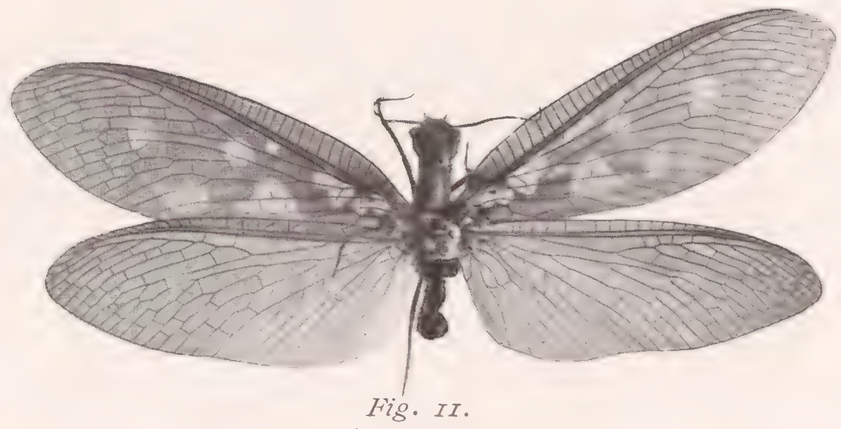

Fig. 11.
(Coll. Selys)

Fig. 12.
(Coll. Selys)

Fig. 13.
(Coll. Mac Lachlan)

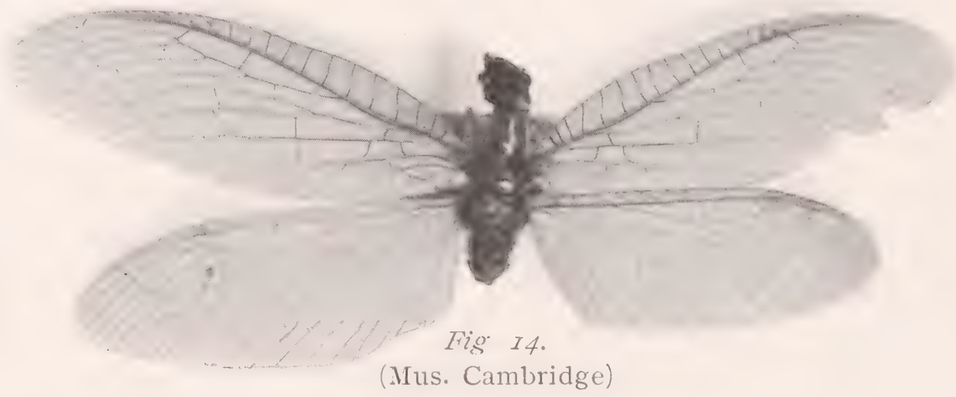

Fig 14.
(Mus. Cambridge)

Fig. 15
(Mus. Leiden)

Fig. 16.
(Mus. Paris)

Fig. 9. Neoneuromus latratus Mac Lachlan
Fig. 10. Chloronia bogotanus Weele
Fig. 11. Protohermes anticus Walker
Fig. 12. Platyneuromus soror Hagen
Fig. 13.. Protohermes montanus Mac Lachlan
Fig. 14. Chloronia Winthemi Davis
Fig. 15. Protohermes albipennis Walker
Fig. 16. Protohermes Davidi Weele

Fig. 17
(Mus. Leiden)

Fig. 18.
(Mus. Leiden)

Fig. 19.
(Coll. Selys)

Fig. 20.
(Coll. Selys)

Fig. 21.
(Mus. Leiden)

Fig. 22.
(Mus. Paris)

Fig. 23.
(British Mus.)

Fig. 24.
(Coll. Selys)

Fig. 25.
(British Mus.)

Fig. 26.
(Mus. Cambridge)

Fig. 27.
(Coll. Selys)

Fig. 28
(British Mus.)

Fig. 17. Protohermes Fruhstorferi WEELE
Fig. 18. Hermes sumatrensis WEELE
Fig. 19. Protohermes grandis THUNBERG
Fig. 20. Hermes Selysi WEELE
Fig. 21. Hermes maculifera WALKER
Fig. 22. Hermes tonkinensis WEELE
Fig. 23. Protochauliodes cinerascens BLANCH.
Fig. 24. Chauliodes pectinicornis L.
Fig. 25. Neohermes disjunctus WALKER
Fig. 26. Neohermes californicus WALKER
Fig. 27. Chauliodes rastricornis RAMBUR
Fig. 28. Archichauliodes pusillus MAC LACHLAN

Fig. 29.
(Coll. Selys)

Fig. 30.
(British Mus.)

Fig. 31.
(British Mus.)

Fig. 32.
(British Mus.)

Fig. 33.
(Mus. Paris)

Fig. 34.
(British Mus.)

Fig. 35.
(Coll. Mac Lachlan)

Fig. 36.
(Coll. Mac Lachlan)

Fig. 37.
(Mus. Leiden)

Fig. 38.
(British Mus.)

Fig. 39.
(British Mus.)

Fig. 40.
(British Mus.)

Fig. 29. *Parachauliodes japonicus* MAC LACHLAN
Fig. 30. *Parachauliodes continentalis* WEELE
Fig. 31. *Neochauliodes simplex* WALKER
Fig. 32. *Neochauliodes fraternus* MAC LACHLAN
Fig. 33. *Neochauliodes meridionalis* WEELE
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Fig. 35. *Protosialis chilensis* MAC LACHLAN
Fig. 36. *Archichauliodes pusillus* MAC LACHLAN
Fig. 37. *Neochauliodes borneensis* WEELE
Fig. 38. *Neochauliodes obscurus* WEELE
Fig. 39. *Neochauliodes koreanus* WEELE
Fig. 40. *Neochauliodes occidentalis* WEELE

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